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# BRITISH MEDICAL JOURNAL

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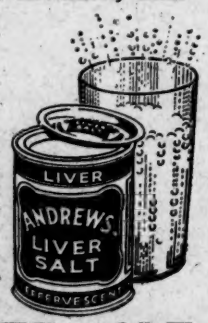


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BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 3 1942

# WARTIME ARRANGEMENTS FOR INTERNATIONAL BIOLOGICAL STANDARDS AND THE NEW STANDARD FOR PITUITARY (POSTERIOR LOBE) PREPARATIONS

BY

**Sir HENRY H. DALE, C.B.E., M.D., P.R.S.**

*Director of the National Institute for Medical Research, Hampstead*

The International Standards for remedies of which the strength has to be measured by biological methods came into being between the two world wars, through action by the Health Organization of the League of Nations. The work was by no means limited, however, to the nations that had joined the League. Important shares in the enterprise, which began in 1921 on Dr. Madsen's initiative, were taken at the outset by experts from the countries that had not yet been admitted, and during the whole period by those from the United States of America. Even when Germany and her associates later withdrew from the League the international standards remained in use among their men of science, though without official recognition, and German industry continued to make important contributions to the materials required for the preparation of new standards.

There could be no doubt that these international standards were worth preserving for their value to research as well as to practical therapeutics, and it was clearly imperative that war should not endanger the existence of materials which embodied so much work of investigation, freely given to this common enterprise by leading experts of many nationalities. Steps were, in fact, very promptly taken by Dr. Hartley, Director of the Department of Biological Standards at the National Institute for Medical Research, to see that adequate quantities of the international standards held in that department were sent to the control centres of other countries, to meet any probable interruption of normal distribution; while the main stocks were so distributed as to minimize the risk of their destruction. When Denmark was invaded, and the further supply of the international serum standards from Copenhagen to many other countries became doubtful, the identical or exactly equivalent British serum standards were made available during the emergency, at the request of the League of Nations, wherever the need should arise. In addition to making arrangements thus to keep alive the mechanism of distribution in most parts of the world, even during the war, Dr. Hartley also deposited several complete sets of all the international standards (or, in a few cases, their exact equivalents) with institutions having the requisite facilities for ideal storage, in countries widely distant from one another. With these are deposited full technical records of the methods of preparing and using them. It can be regarded as practically certain, therefore, that when the war comes to an end these standards will be available from some source to any organization which can suitably assume responsibility for the matter in the interest of the whole world.

Meanwhile, apart from the special arrangements thus made for the standards which already existed, it was necessary to provide for the completion of work on the materials for certain new ones which were under investigation in Sept., 1939. In one such case the material was on international trial for its suitability to create an entirely new standard for vitamin E; and in due course, after agreement among as many of those concerned with the matter as could still be reached by correspondence, the international standard for vitamin E was adopted and made available (*British Medical Journal*, 1941, **2**, 553). In another case the trials, and the subsequent agreement by correspondence, were concerned with the replacement of an existing standard, the supply of which was nearing exhaustion. This was the international standard for preparations of the posterior lobe of the pituitary gland.

## International Standard for Preparations of Pituitary Posterior Lobe

The history of this standard goes back to the first International Conference, held in Edinburgh in 1923, to consider the possibility of international agreement on the biological standardization of certain hormones and drugs. Among the pharmacological experts from different countries who were its members, there were few who then recognized the general importance of the principles on which Paul Ehrlich had firmly based the standardization of the antitoxic sera some thirty years earlier—the creation of a dry stable standard of reference, the definition of the unit as the activity of an exact weight of this material, and the use of samples of this central standard as a currency, enabling the weight representing the unit to be determined by comparison for any other subsidiary standard made for national or local use. In the case of the pituitary posterior lobe, indeed, Professor Carl Voegtlin, of the Public Health Laboratory in Washington, put forward in 1923, at the Edinburgh Conference, a sample of the dried acetone-extracted gland substance for consideration and co-operative trial, with a view to its adoption as a standard of a kind. The trials were successfully carried out, and the second Conference summoned to deal with such matters, which met in Geneva in 1925, readily agreed to adopt Professor Voegtlin's proposal. At a relatively late stage of its discussion this Conference also made the important decision to define a unit of activity for post-pituitary preparations as the activity of 0.5 mg. of the dried material, which it had already agreed to recognize as a standard. The full record of its recommendations, however, makes it clear that it did not regard this definition as applicable only to a particular quantity of a standard material, kept at and distributed from a recognized centre. On the contrary, the evidence presented led its members to assume that any sample of this

material, if prepared in accordance with the prescribed method from the perfectly fresh substance of ox pituitary glands, would have exactly the same activity; so that 0.5 mg. of any such material, wherever it was prepared, would represent 1 unit of activity. And although Professor Voegtlin was asked by the Conference to make available a small quantity of the material prepared in his own laboratory, this was to be furnished "to any authority which may require it for confirmation of its own national standard." In other words, the object was clearly to enable any national centre which had not confidence in the freshness of its raw material, or in the perfection with which it had followed the prescribed routine of preparation, to assure itself that it had in fact produced a standard of the expected optimal value. There was no suggestion that it would be proper to define the unit as corresponding to some greater or smaller weight than 0.5 mg. of such a secondary national standard if it should be found in a comparative test to be weaker or stronger than the sample provided by Professor Voegtlin's laboratory.

Experience in the administration of the international standards soon showed, however, that the basis which the Geneva Conference of 1925 had regarded as suitable for this particular case was not in fact practically applicable. A British national standard for the pituitary posterior lobe had been prepared in 1926, and had been found, indeed, by tests carried out both in London and in Washington, to be indistinguishable in activity from Professor Voegtlin's original standard preparation. Fortunately this British standard, through the co-operation given by the Armour Laboratories of Chicago in providing the material for it, had been prepared on a scale large enough to enable it to be used for a wider need than that of the national control. Applications received from all over the world soon showed that, whatever had been the intentions of the Geneva Conference, the demand for samples of an international standard for this endocrine preparation would be comparable to that for others, such as the insulin standard, for which a general distribution had been arranged. The material furnished by Professor Voegtlin being in these circumstances rapidly exhausted, it was possible to meet the situation by supplying samples of the British national standard, with a suitable guarantee of its strict equivalence to Professor Voegtlin's original sample. During this intermediate period national standard preparations were made in a number of countries and compared with the British standard. None of these other preparations was found to be more active than this, but there were a few of which the activity was perceptibly lower.

Another point of some importance has come clearly into view since the decisions made in 1925. At that date the question whether the extract of the pituitary posterior lobe owed its activities to one or to several active principles was still a matter of controversy; and the Geneva Conference had accordingly been able only to decide that the unit of activity should be regarded as contained in 0.5 mg. of the standard preparation, whether the test used for its comparative determination was based on the pressor or on the oxytocic action. By the time another Conference met in Frankfurt, in 1928, the question had been settled, as regards the artificial extract in common use, by the demonstrated possibility of making separate pressor and oxytocic extracts, each practically free from the other type of activity. It was possible, therefore, to amend the original definition in detail, and to recommend that "the activity of every such preparation should be expressed in relation to the international standard in units of pressor or oxytocic activity, and that in each case *the unit of such activity* shall be that of 0.5 mg. of the standard powder." There was no further step, however, towards the recognition of a particular preparation as the standard in question; it was still possible, by implication, to make the standard anywhere by following the prescribed routine.

By Oct., 1935, the experience which had accrued enabled the League's Permanent Commission on Biological Standardization to take the further and important step of formally accepting as the international standard preparation the British standard for the pituitary posterior lobe, which had by then been semi-officially current for international purposes for some 9 years. Since the decisions made in 1928 there had been more discussion of the possibility that the third important therapeutic application of this extract, for its antidiuretic action, might be due to yet another separable principle. This could not then (and cannot even now) be regarded as finally settled; so that the Commission at its meeting in 1935 could only provide for any possible development by authorizing the definition of a unit of antidiuretic activity, again as the activity of that type in 0.5 mg. of what was now the international standard. Unfortunately all these decisions adopting and defining the international standard and units were made, not by a conference of specialist experts, but by a Permanent Commission consisting of national representatives who left standing the implication of the earlier recommendations, according to which the standard would still serve to indicate an optimal activity rather than to fix the value of the unit and make it unalterable in either direction.

### New (1940) Standard for Pituitary Posterior Lobe

It might well be suggested that such differences of conception as to the meaning and use of a standard would in this case be of theoretical rather than practical interest, since other standards had been made which were equal in potency to that being then adopted for international use, some which were weaker, but none thus far which were perceptibly stronger. And the question did not acquire practical importance until, in 1939, it became necessary to prepare a new supply of international standard material to replace in due course the one which had served for so many years in effect, and since 1935 with official recognition. With the renewed and effective co-operation of the Armour Laboratories a further quantity of the acetone-extracted and dried powder of the fresh posterior lobe substance was obtained, and was further and finally desiccated under the conditions which have now become a standard routine in the Hampstead Institute. Samples of this were distributed to expert collaborators in a number of different countries, for assay with the greatest practicable precision in comparison with the still current standard. Reports were eventually obtained from 13 different laboratories, of which 5 were in the U.S.A., 1 each in France, Holland, and Hungary, and 5 in Britain. In all, 90 determinations of the oxytocic activity of the new standard were reported from 12 of these laboratories and 38 determinations of the pressor activity from 9 laboratories; while 7 laboratories reported determinations of the antidiuretic activity involving the use of a total of more than 600 rats.

It was then at once obvious that, with very few exceptions, the results indicated a small but significantly greater activity for the new than for the current standard with respect to all the three types of activity for which the two had been compared. Two of the co-operating laboratories failed, indeed, to detect any difference in the oxytocic activities, and reported that the two standards appeared to be equivalent. All the others, however, found the new standard stronger in this respect, the highest oxytocic activity reported for it being 125% of that of the current standard. The weighted mean of the whole series of assays for oxytocic activity gave it a value of 111%. The values reported for its pressor activity varied, again, from 100 to 130%, and the weighted mean of all the determinations gave it a pressor activity of 113%. Of the 7 reports on its antidiuretic activity, 6 assigned it values between 107.5 and 122%, with a weighted mean of 116%. The seventh was quite aberrant from the others, giving a value of only 73%. It may be noted, however, that the inclusion of this aberrant finding in the calculation of the average would reduce the weighted mean of the antidiuretic values obtained for the new standard to only 112%, bringing it, in fact, into even closer correspondence with those obtained for the new standard's oxytocic and pressor activities.

By the time these results had been assembled and made available for analysis the outbreak of war had rendered it necessary to postpone, for an indefinite period, any project of an International Conference for personal discussion of their significance and of the appropriate action to be taken on them. The replacement of the current standard, however, before it had been exhausted in distribution, was becoming a matter of urgency, and it was accordingly necessary to arrive at an international agreement by correspondence. There could be no doubt that the new material was suitable for adoption as a standard, and it was further clear that the three important types of activity were represented in it in practically the same

proportions to one another as in the current standard; so that the units of oxytocic, pressor, and antidiuretic activity could still be defined as the activities of one weight of the new standard. The only question to be discussed and decided was the weight of the new standard to be recognized as representing the unit in each case: should it remain at 0.5 mg., or should it be slightly diminished, in inverse proportion to the greater activity of the new standard? The following points required consideration in arriving at an agreed decision.

## Points requiring Consideration

1. The decision to regard the standard material as giving to the unit an optimal rather than a fixed and arbitrary value must be considered still effective unless a new international agreement was made, for sufficient reason, to change it.

2. There were several features in the definition of the standard material which might be expected to give scope for variation in its activity. The limited experience available at the time of its adoption had not properly justified the assumption that every sample of material so defined would have precisely the same activity, wherever prepared. The material was to be the "fresh" substance of the "posterior lobes" of oxen, extracted with acetone and dried. Even if we allow that the last two procedures have end-points in complete extraction and desiccation, the interpretation given by different workers to the expressions "fresh" and "posterior lobe" could not safely be assumed to be precisely uniform. The activity of the material has, in fact, been observed to fall rapidly with increase of the interval between slaughter and the final stabilization of the dissected substance by acetone or rapid drying. Freshness in this sense, and consequently activity, may obviously vary with the efficiency of organization at the source. This might well improve during the 13 years between the preparation of the two standard materials, and any such improvement might further be accentuated by an increased use of refrigerants even during a quick transfer from abattoir to laboratory. Improved standards of dissection, again, might well give a more severe discrimination between the material to be retained as unquestionably "posterior lobe" substance and that to be rejected as more properly belonging to the stalk; while even small tags of completely inactive dura mater might easily have been included in some preparations of the material by hasty or imperfectly trained dissectors. In these different directions greater experience and perfection of procedure might easily account for the (average) additional 12% of activity shown by the new standard material.

3. The whole basis of biological standardization in units defined by fixed weights of standard preparations, since Ehrlich introduced this method for diphtheria antitoxin, has depended on the assumption that the standard itself has a practically indefinite stability. In the case of an antitoxic serum this is inevitable, since there is no independent basis of comparison and no natural upper limit to the activity of such a standard. All experience, moreover, has shown that such sera, when dried, have a high stability even in air at ordinary temperatures; so that there is no reason to suspect that a serum standard, when kept in perfectly dry nitrogen below 0° C., will suffer any appreciable loss of activity before it is due to be replaced by a fresh one.

In the case of the standard for pituitary posterior lobe the conditions are not identical with those for the sera. Even when the drying of the gland substance has been completed a measurable loss of activity occurs, sometimes in less than a year, if the dry product is kept without special precautions in air at ordinary room temperature. This would not justify an assumption that when sealed in perfectly dry nitrogen and kept at a temperature below 0° C. it would be subject to a significant loss of activity, even in many years; and the fact that none of the subsidiary standards made during its currency had proved to be stronger, while more than one had been somewhat weaker, was against the supposition that the current standard had suffered an important loss of activity during the 13 years since its preparation. Nevertheless it had to be recognized that a loss of activity of the order of 10% would be extremely difficult to detect in the absence of an independent and certainly stable basis of comparison, and that the presumption of perfect stability for this standard substance was not so overwhelmingly strong as in the case of the serum standards.

4. From the scientific point of view the maintenance of any unit of measurement without change has great importance. From the point of view of practical application, the avoidance of any possibility of a decline in the value of the unit is more important for remedies such as the pituitary posterior lobe preparations than for an antitoxic serum. With diphtheria antitoxin, for example, the effect of a small decline in the value of the unit over a decade or so—there is no reason whatever for suspecting its occurrence—would have been completely swamped in practice by the great increase, probably tenfold, in the customary dosage in units made possible in the same period by improvements and refinements of manufacture. Pituitary posterior lobe extract, on the other hand, cannot be given with a large margin of excess units to cover any possibility of a decline in unit value, since over-dosage may be as dangerous from excess of action as under-dosage from lack of effect in an emergency. In that respect its position is comparable to that of insulin.

5. Adoption of the same weight of the new standard as of the old—0.5 mg.—to represent the unit would involve an increase of the unit by not more than 15% of its *present* value. If the activity of the old standard had been constant for 13 years there would be this increase in the value of the unit as originally accepted, but it would be inappreciable in practice. It is to be noted, indeed, that several of the participants failed to detect it even in the laboratory assays made with the special care appropriate to the fixation of the unit value of a new standard. There was no risk, in any case, that such a fractional increase in value would be repeated indefinitely at successive replacements of the standard, since the complete preservation of the activity present in the perfectly fresh gland substance, as contemplated in the original definition, sets a natural upper limit; it is probable, indeed, that the slightly greater activity of the new standard represents a close approach to that limit, so that a further increase of value at later replacements is improbable. On the other hand, the possibility could not be excluded that the increase in the unit on its present value might represent a very slow deterioration of the old standard, with an average loss of about 1% of its activity in each year after its preparation; and if that were the case, a decision to fix the weight of the unit of the new standard at about 0.45 mg., to make it equivalent to 0.5 mg. of the old standard *at the replacement date*, and a continuation of this policy at successive replacements, would obviously involve the risk of a cumulative depreciation of the unit value which would eventually become of serious practical importance. It was necessary, therefore, to balance the disadvantage of a probable single increase of the value of the unit by not more than about 15% against that of a possible *succession* of depreciations of its value in the same proportion.

With all these considerations before them the participants in the preparatory investigation unanimously agreed that the weight of the new standard for the pituitary posterior lobe, representing 1 unit of activity, should be 0.5 mg., although this would entail an increase of the value of the unit of the order indicated at the time of adoption of the new standard.

## Conclusion

Though such an increase in the value of the unit is not likely to be significant, or even appreciable, in practice, it will have a greater importance for the manufacturer, concerned to ensure that his product will not be found deficient if independently tested in comparison with the new standard preparation. The *British Pharmacopoeia, 1932*, in describing the assay of an extract for its oxytocic activity in comparison with the standard preparation, indicates the limit of error of the test as ±20%. It will be obvious that a product which had been passed for issue on a test made in comparison with the old standard, and which through testing error had a true activity nearly 20% below the indicated unitage, would incur a greatly increased chance of failure when compared with a standard some 15% stronger. While the existing conditions made it unusually important to avoid wasting material which, from the practical point of view, was not significantly weaker than its stated activity in units, it was also important that the small change involved in adopting the new standard should be made with the greatest practicable speed and unanimity.

Accordingly, the Hampstead Institute has issued a new Memorandum relating to the Second International Standard for Pituitary Posterior Lobe Preparations, in which the grounds for its adoption and for the redefinition of the unit, as above described, are discussed in detail. The new Standard and the Memorandum have been supplied to those countries at present accessible and to the Health Organization of the League of Nations at Geneva; and, in this country, the licensed manufacturers of pituitary (posterior lobe) extract have been notified of the changes indicated above and have been supplied with samples of the new standard preparation and the relevant Memorandum.

# THE NON-TOUCH TECHNIQUE

## WITH SPECIAL REFERENCE TO THE OPERATIVE TREATMENT OF SIMPLE FRACTURES

BY

**H. A. T. FAIRBANK, D.S.O., M.S., F.R.C.S.**

*Consulting Surgeon, Hospital for Sick Children, Great Ormond Street, etc.*

When Arbuthnot Lane (1894) first advocated the extended use of internal fixation in the treatment of simple fractures he insisted on a scrupulous aseptic technique. A technique founded on his original suggestions has become the routine practice of a large number of surgeons for every operation with the exception of those—e.g., abdominal operations—in which the introduction of the gloved hands into the wound is necessary. This is now known as the "non-touch technique," an essential feature of which is that a gloved finger is never allowed to come in contact with the wound or with anything introduced into it. When surgeons speak of the non-touch technique do they all mean precisely the same thing? The answer must, I think, be in the negative, particularly if the details are examined minutely. Assuming this view to be correct, it occurred to me that it might be useful to describe in detail the precautions which many surgeons consider advisable in every operation. It cannot be too strongly insisted that the scrupulous care inherent in this technique should not be regarded as called for only when a simple fracture is plated. If the precautions are accepted as advisable, even imperative, for the internal fixation of a fractured bone, they are surely advisable in every operation, with a few well-recognized exceptions.

The reason for the technique is that gloves are unreliable and cannot be guaranteed against perforation, particularly if forcible use of the hands is necessary. The technique and theatre routine described below are approximately those which, under the inspiration and guidance of Arbuthnot Lane many years ago, became the general practice of the surgeons working at the Hospital for Sick Children, Great Ormond Street. The same or a closely similar technique is now the routine practice in many other hospitals. Scrupulous attention to detail by all concerned with the operation is essential.

### Theatre Routine

The skin over a *wide* area should receive a double preparation, with an interval of some hours between them, before the case is taken to the theatre. On the table the part is again painted with a solution of iodine or other preparation. The operation area is surrounded by a generous supply of sterile mackintoshes and towels, the latter being firmly clipped together and to the skin. If it is necessary to palpate the part before making the incision the skin is covered with a sterile towel or a swab consisting of several layers of gauze.

All instruments, swabs, etc., are dry: no germicide is used except that in which ligatures and suture materials are normally kept. Dissecting forceps, artery clips, retractors, and, in fact, the instruments generally, are long, so that the hands are kept well away from the wound. The theatre sister holds an instrument with forceps when passing it to the surgeon, or at any rate carefully avoids touching "the business end." All needles are threaded with the help of two pairs of forceps, and are passed to the surgeon gripped in a needle-holder. Ligatures, if used at all, are touched only with forceps and scissors and they are tied with forceps. Swabs, preferably of dry gauze, are never handled by anyone: all swabbing is done with forceps. The chief assistant is never without a pair of dissecting forceps in one hand for this purpose. Instruments used for any length of time, or forcibly, are resterilized. The knife employed for incising the skin is discarded, and a fresh knife taken for the deeper dissection. When the bleeding vessels have been secured and the wound is dry, the cut edges of the skin may be painted with iodine solution. Towels, tetra-cloths, or "veils"—call them what you will—are clipped *over* the edges of the wound, special care being taken at the extremities of the incision, to exclude the possibility of any instrument, suture, or swab coming in contact later with the raw edges of the skin. Experience shows that it is necessary to stress this point: it is the cut edge and not the surface of the skin which is the special danger. If the wound is large, towels may be used; if smaller, a sheet of close-mesh butter muslin is more convenient. I prefer specially prepared sheets of waterproof batiste between layers of muslin or gauze for this purpose. Lane insisted that the skin-edge clips should be long and heavy, so that they lie well away from the wound. For the vessels he preferred the Mayo-Ochsner type of clips, which are not only long and heavy but are powerful enough to crush the vessels and make ligatures unnecessary for any but the larger vessels. For feeling, blunt dissection, etc., a Buchanan's dissector is a most useful instrument. A needle-holder is indispensable: all sutures, including those in the skin, are tied with this and a pair of dissecting forceps.

In the open method of fracture treatment there is one, and only one, additional precaution to be taken. On a table beside the instrument table is a small sterilizer, the water in which is kept on the boil throughout the operation. All drills, screws, plates, nails, wire, etc., are left in this till required. Screw-holders, plate-holders, screw-drivers, etc., shortly before use are transferred from the instrument table to the small sterilizer, the handles projecting over the edge. After use on each occasion these instruments and the drill are returned to the sterilizer till again required. The business ends of the drill and screw-driver are returned to the boiling water after the insertion of *each* screw. In short, any non-absorbable foreign body that is to be left in the wound, and every instrument that comes in contact with these, is guarded from air-borne infection so far as is possible.

### Points in Fracture Treatment

Before deciding to operate on a closed fracture that cannot be satisfactorily dealt with by other methods, the surgeon should never fail to ask himself these among other questions: Is this a reasonably easy carpentering job? If I tackle it, have I a good chance of achieving something approaching anatomical perfection? Is there enough accessible bone on both sides of the fracture for the number of screws necessary to maintain the position securely? If not, can the fragments be held securely by some other device?

A few other points may be mentioned. The best period during which to operate on a simple fracture is, in my opinion, the second to the fourth day after the accident. This gives the patient time to recover from the injury, and the surgeon time to make the necessary arrangements for the operation and to have the patient's skin carefully prepared. Two assistants are necessary besides the sister in charge of the instruments. Lane insisted on a generous incision giving free access to the fragments, due regard being paid to the avoidance of damage to important structures. He stripped the periosteum from the bones, and this certainly facilitates exposure of the bone ends, the clearing of clot and muscle, and the reduction of displacement. It is questionable whether stripping the periosteum is altogether wise, and some surgeons prefer to do as little of this as possible. The subperiosteal operation gives rise to less bleeding in a *recent* fracture. Retraction of muscles is achieved with long levers, the curved ends of which are slipped beneath the bone. Lane's tapered lever with serrated edges ("rotating instrument") is useful between the fragments for sliding one on the other and overcoming shortening.

In a transverse fracture, angulation of the limb at the site of fracture till the ends of the fragments engage, followed by straightening the limb, used to be of value more often than it is in these days of orthopaedic tables with facilities for mechanical extension. Peter's lion forceps (double- and single-claw), with a screw to lock the handles, are invaluable for holding the fragments in place while the screws are inserted. When difficulty is experienced in preventing the fragments from slipping, and particularly when a third fragment of some size is present, it may be helpful to include the plate as well as the fragments in the grip of the forceps. The plate must be bent till it accurately fits the surface to which it is applied.

There must be no spring exerting a pull on the screws. Plates should, if possible, be applied to a surface of the bone that is covered by muscle, and they must be stout enough to make bending or breaking improbable. Drills must correspond to screws: soft or cancellous bone calls for smaller drills than hard bone. Lane advised that screws should pierce the distal compact bone only in young children. Particular care has to be taken that the drill-holes for the first two screws correspond with the centres of the holes in the plate, or the fragments may be slightly distracted—an undesirable though fortunately not necessarily a fatal fault. Screws should be driven home tight. The number of screws inserted in each fragment *must* be adequate for the work they have to do. For the femur, at least four screws in each fragment are necessary; for the tibia three screws; and for the radius and ulna two screws in each fragment. One of the commonest mistakes is the use of too short a plate and an insufficient number of screws. Another common fault is inadequate post-operative external splintage, or, if adequate, not maintaining this splintage long enough. These errors all lead to undue strain on the screws, which become loose, with disastrous results. It is not always remembered that with internal fixation of the fragments callus is reduced to a minimum, and in many cases no provisional callus whatsoever is formed. External splintage is necessary for a longer period, if the shaft of a bone is involved, than if a fracture is treated without operation, the apposition of the fragments being equally good in both. In the forearm the fragments may be sufficiently stable when placed in apposition to make a plate unnecessary.

### The Vitallium Screw

Vitallium screws, long enough to pierce the cortex on both sides of the medullary canal, are coming into fashion, and some surgeons are showing an inclination to rely entirely on them, no splints of any kind being used. This tendency must be watched: careful judgment is necessary if disasters are to be avoided. Incidentally it is my opinion that the introduction of vitallium should not be regarded as the solution of all our troubles. Great care to guard against sepsis is still just as necessary as it was. I consider that trouble with plates and screws points to a faulty technique on the part of the surgeon. Screws become loose because they are subjected to too great a strain or because they are infected, or both. The theory of electro-chemical irritation around a steel screw is attractive but not very convincing. How do the supporters of this theory explain the by no means rare experience of finding, when removal of steel screws is called for long after their insertion, that one screw is loose while its neighbour can only be removed with the help of a screw-driver? The thread of the vitallium screws reaching this country seems to be quite unnecessarily fine: a coarser thread would, I think, be an advantage. Wires and bands around the shaft of a bone are to be avoided as a rule. Wire rarely affords adequate fixation in the shaft of a bone: disasters following the use of wire are fortunately less common than they were. Parham bands, an attractive device for an oblique fracture of a shaft which is of even diameter in the region of the fracture, are dangerous. If used at all they should be removed later. In the absence of all obvious signs of infection a circular line of absorption of the bone may occur beneath the band, and as there is no sub-periosteal callus formed whatsoever, this may weaken the bone to a dangerous degree.

There are definite indications that the pendulum, which I think had swung rather too far from operative to non-operative methods of treatment for simple fractures, is swinging back towards the more extended use of internal fixation. This tendency will need careful watching, or the pendulum may again swing too far.

Finally, I venture to remind my readers that cutting down on a simple fracture is not an operation to be lightly undertaken by any surgeon. Like many another specialized operation, it is a justifiable procedure only in the hands of a surgeon with the necessary training and, above all, one whose technique is above reproach.


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# SURGICAL AMPUTATIONS AND THE FITTING OF ARTIFICIAL LIMBS


BY

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I would like first to express my indebtedness to the Ministry of Pensions, including all the surgical, medical, and technical officers, for granting facilities to make use of the data and information collected in the past 25 years, and in particular to Dr. R. Langdale-Kelham, the senior limb-fitting surgeon to the Ministry, with whom I have worked for some time and who has given me the opportunity of studying the question of fitting of limbs in detail. It is hoped the information and suggestions incorporated in this paper may be of some service to surgeons and possibly to amputees.

### Amputations and Rehabilitation

Amputations have been recorded in many surgical textbooks over a number of years, particularly since the advent of aseptic surgery. The types and sites of similar amputations have varied, with the result that a difficult problem is left in many instances for those called upon to supply the prosthesis. It is stated that a good limb-maker should be able to provide a suitable prosthesis for any type of amputation, whether following a surgical operation or due to a congenital deformity. This is quite true, but it is definitely established from results of limb-fitting during the past 25 years that only certain lengths and types of stumps render the amputee free from further surgical attention. Also, latterly the artificial limb has been improved and re-designed to cause less strain and give more comfort to the wearer.

When an amputation is performed upon any limb it starts a new phase in the life of the amputee. He must rehabilitate himself, and rehabilitation is obtained only by co-operation between the patient, surgeon, and all responsible for the treatment of the stump up to and including the actual fitment of the prosthesis. There are three main objectives: first, the surgeon should provide a stump which will not require any further surgical attention; secondly, the nursing staff and others concerned should treat the stump by correct bandaging and exercises, so that it may be fitted in the shortest time with a prosthesis of a design suitable for the patient's future work; thirdly, the patient should be taught to use the prosthesis correctly to enable a speedy return to his original work or some other suitable employment, and so remove the fear of being styled a "cripple."

With the exception of Service cases from the last war it can be stated generally that surgeons have not been able to follow up and watch closely the results of amputations they have performed. Once the operation scar is healed the amputee leaves the hospital with little instruction upon the care of the stump or of the prosthesis he obtains. If the stump breaks down for any reason the amputee consults his own doctor, who may have had little experience in the treatment of such cases.

During the latter part of the war of 1914–18 the Ministry of Pensions set up an organization, with its main centre at Roehampton and 17 centres in the provinces, to provide all Service amputees with prostheses, to supervise the fitting, and to repair broken or worn parts. A very important feature was the regular inspection of the amputations, with the appropriate treatment when required. Records of this work were carefully summarized, with the result that valuable information was obtained, as I shall attempt to show.

#### Above-knee Amputations

*Weight-bearing.*—Nature has so developed the human body that, when walking, the weight is borne by the foot, and when sitting by the ischial tuberosity. If the lower limb is amputated at any level the weight ought therefore to be supported by the ischial tuberosity. About 20 years ago most amputees took the weight upon the end of the stump, but within five years over

75% of such cases were corrected. A number had to be re-amputated for surgical reasons, while others were altered before the end of the stump had deteriorated. One seldom now sees a case in which the weight is taken by the end of the stump: such amputations as the Stokes-Gritti and the transcondylar were re-amputated. This above-knee stump fits into the "socket" of the prosthesis, made of metal or wood, carefully shaped so that the ischial tuberosity rests on the inner edge, the patient thus sitting in the socket. Upon walking he naturally lifts the stump a trifle out of the socket, producing a slight "piston" action which is by no means detrimental to the stump except when the scar is terminal and adherent to the amputated end of the femur. Also there should be no scar tissue near the ischial tuberosity, the head of the great trochanter, or the upper part of the thigh, if this can be avoided.

*Musculature.*—The muscles of the thigh are used by an amputee to control the prosthesis in exactly the same manner as by a normal walker. The flexor muscles enable the stump to lift the prosthesis upward and forward, the lower part being swung forward at the knee-joint. The heel is then pressed on the ground and the extensor muscles push the socket backwards, extending the knee-joint and maintaining it in full extension. Diagram 1 shows the stump control of the prosthesis and the

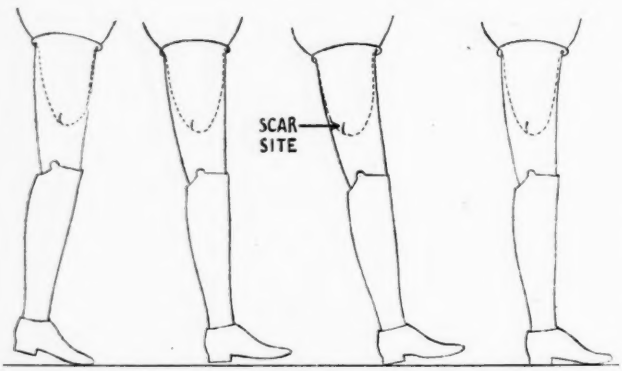



Diagram 1

position of the scar. The adductors and abductors control the balance of the amputee on the limb as with a normal person; therefore during amputation as much as possible of these muscles should be left. With the ideal stump length, discussed later, only a small portion of the adductor magnus is removed, as shown in Diagram 2. The extensor muscles should be

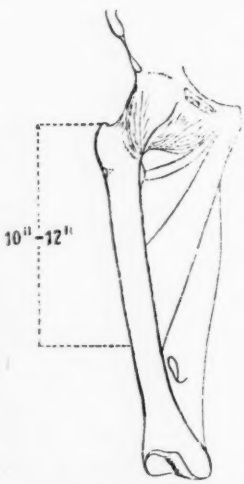



Diagram 2

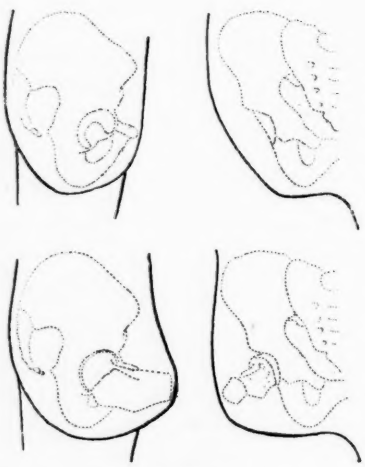


Diagram 3

severed so as to end about half to one inch above the scar in order to avoid adhesion between the muscle ends and the scar tissue.

*Stump Length.*—The experience of the past 20 years and the periodic examination of stumps clearly indicate that the ideal length is between 10 in. and 12 in., as measured from the tip of the great trochanter to the amputated end of the femur. Such a length requires no further surgical treatment and affords adequate control of the prosthesis. A number of amputees with a longer stump experience circulatory troubles, while many have had to undergo re-amputation.

*Scar.*—With the ideal stump there is an ideal site for the scar, as depicted in Diagram 1. The larger anterior flap method ensures a transverse posterior scar about 1½ in. from the end of the stump. If complete haemostasis is obtained no drain is required and the wound will heal quickly. There are many reasons for choosing this position, the chief being that the scar will never have any direct pressure exerted upon it by the use of the prosthesis and also that there will be no traction over the scar such as would occur if it were terminal.

*Flaps.*—The flaps need only contain enough tissue to maintain their own nourishment; any superfluous tissue may cause discomfort in the wearing of the prosthesis.

*Sciatic Nerve.*—Various methods of dealing with this nerve during amputation, such as crushing, ligaturing, or injecting the end of the nerve with alcohol or similar substances, have been described in textbooks. Some of these procedures are unfortunately still in use, with the result that there is often a great deal of pain, and in numerous cases "phantom foot" is felt. The nerve should never be crushed, ligatured, or stretched. It should be treated as carefully as possible, being very delicately dissected out of the musculature and severed a little shorter than the cut muscles to prevent adhesion of the nerve-end. The artery of the nerve may in exceptional cases need tying.

### Short Above-knee Stumps

If a stump has to be shorter than the ideal just described the amputation should be guided by the above principles, the chief consideration being to leave as much of the adductor musculature as possible, while at the same time removing all pathological tissue to obviate any further surgical intervention. It must be stressed that there should be no complete disarticulation of the head of the femur unless this bone or part of the joint is diseased. After amputations which leave about 4 in. of femur a special prosthesis is designed, because this short stump cannot be accommodated in the ordinary type of socket and there is no stump control. This short stump is flexed to 90 degrees from the normal position and a socket fitted half-way round the pelvis. The projection of the end of the femur, together with the natural contour of the body with the femur in position, allows the patient to wear the socket comfortably. With a complete disarticulation the socket tends to slip down and rotate on the body with every step taken. Whenever possible it is desirable to leave a part of the head of the femur for the comfort of the patient (Diagram 3).

### Below-knee Amputations

With an ideal amputation and a correctly fitted limb it should not be possible to detect that a prosthesis is being worn. Examination of hundreds of cases shows that long stumps break down from circulatory disturbances, while a chronic bursitis is the result of taking the weight of the body on the head of the tibia. Modified Syme's amputations and long stumps that have taken end-bearing often call for re-amputation. The following are three important points:

1. Weight-bearing in the past has been largely taken by the head of the tibia, with a leather corset fitted round the thigh for some support. Many cases are being seen in which the resultant bursitis is too painful to allow of a continuance of this method. A longer corset is now fitted which will take the full weight on the ischial tuberosity.

2. The calf muscles should be cut away to produce a conical-shaped stump with their ends just above the resultant scar. A soft flabby stump is more uncomfortable and more difficult to fit than a thinly covered one.

3. Stump length is measured from the inner articular surface of the tibial head to the amputated end of the tibia, and all that is required is 5 to 5½ in. The fibula must be at least half an inch shorter than the tibia, otherwise bony union occurs, causing pain at the stump end or, at times, at the head of the fibula. The head of the fibula should not be removed except for pathological reasons. The front sharp edge of the amputated tibia

should be bevelled to prevent its wearing through the skin. The scar should be about 1 in. from the end of the stump on the posterior surface, formed by a large anterior flap with no superfluous tissue. This site will prevent adhesion to the bone-end. The nerve should be treated with extreme care and not be subjected to trauma by crushing or ligaturing.

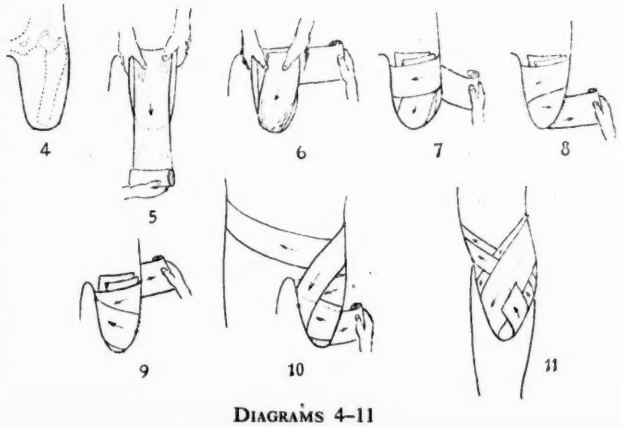
### Stump Treatment

Care and treatment of the amputated limb are almost as important as the amputation itself, and should begin from the day of operation. The stump does not require a pillow or pad to rest upon, but ought to lie extended, while in the case of a below-knee amputation a back splint is often necessary to prevent flexion of the knee-joint. After the stitches have been taken out and the wound is healing, active exercises should be started while the stump is still bandaged. Movements of the joints must be encouraged, to tone up the muscles and assist in tissue reduction in the stump. Massage has been shown to be inadvisable. Furthermore, it does not reduce the oedema, but rather irritates the nerves, and should therefore not be given at any stage during recovery.

A temporary walking-leg or plaster pylon has been used in former days with the claim that it reduces terminal oedema and oedema of the stump as a whole. This pylon could not be ordered until the wound was healed and the scar consolidated, which with an above-knee amputation often took a month or more. Then the pylon was ordered and made in a week or so. The patient wore the pylon, in an effort to reduce the oedema, for a further month. I have kept careful record of measurements of stumps which had pylons fitted and of the amount of oedema reduced. In some cases the oedema actually increased ; in some it remained stationary ; while in a few there was a slight reduction but the patients had acquired the very distinct " pylon " swing, which was very difficult to overcome when the completed prosthesis was worn. It will be seen, therefore, that it was about 10 weeks before the artificial limb could be ordered. The pylon is now only used in special cases.

The modern method devised by the Ministry of Pensions and adopted by the E.M.S. is to bandage the stump with crêpe bandages from the time the stitches are taken out. It has been proved from records compiled at Roehampton that an above-knee stump requires only three weeks' bandaging to render it fit for measurements to be taken for an artificial limb. Thus with this above-knee site actual limb-fitting can take place in less than 8 weeks from the day of amputation, resulting in a great saving of time and expense, and the earlier return of the amputee to work.

In bandaging above-knee stumps it is imperative to use crêpe bandages 6 inches wide. At present they are not made long enough, so that two have to be sewn together. The bandage must be wound tightly and evenly, otherwise the necessary firm application to the stump cannot be obtained (Diagrams 4–11).




DIAGRAMS 4–11

The end of the bandage must be applied to the upper front surface of the stump and be held securely by the patient's thumbs. It is then passed down the front of the stump, back over the end, pulled tightly with even pressure to the upper part of the posterior surface of the stump, and held by the patient's fingers. This process is repeated by bringing the bandage down the back of the stump, over the end to the starting-point—still being held by the patient's thumbs—and drawn down over the end to the back of the stump.

The patient must not allow the tension to slacken in the bandage, which thus supports the tissues in the end of the stump. The bandage is next applied round the upper part of the stump to hold the first applications, and firmly enough to allow the patient to remove his hands. It is brought round the end of the stump very tightly so as to compress the tissues, but not too tightly round the upper part. If the bandage was finished off in this manner it would tend to slip down. and off the stump when the patent walked about. To prevent this it is applied round the waist as shown in Diagram 10, and finally round the stump (Diagram 11). Particular care should be taken that the crossing of the bandage on itself when applied round the waist occurs at the side of the body and not on the front, otherwise there will be a tendency to flex the stump. This bandage should be reapplied three or four times a day to take up the new shape which results from reduction of the oedema. Figures are available which show that stumps treated in this way have uniformly shrunk 2 in. in circumference in less than 14 days, thus rendering limb-fitting possible.

The application of a 4-in. bandage to an above-knee stump is useless. Furthermore, the method of applying a crêpe bandage tightly at the upper part of the stump and bandaging downwards will retard the reduction of oedema because it imposes a constriction on the upper part.

To treat a below-knee stump a 4-in. crêpe bandage is applied as in the above-knee method. Three slings are used to support the oedematous tissue, and the bandage is applied tightly and firmly around the end. The bandage is taken above the knee to prevent it slipping off the stump, but the front of the knee over the patella is left free so as to afford mobility to the knee-joint.

*Stump Exercises.*—A recent development in the care of stumps after amputation is a course of exercises adopted to re-educate the remaining muscles of the stump and thus prepare it to control the artificial limb. A narrow sleeve, about 4 in. wide at the back and 2 in. at the front, from which a cord passes over a pulley and suspends a weight of 7 to 14 lb., is placed on the stump as shown in Diagram 12A. The stump is

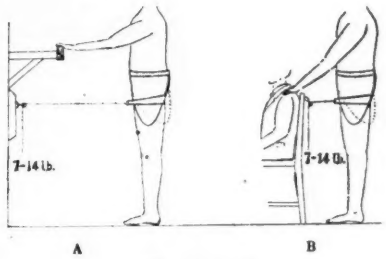



DIAGRAM 12

extended against the pull of the suspended weight to assist the musculature in regaining its strength—the weights, rate of exercise, and duration varying with the increase in muscle tone. The adductors are similarly exercised by the patient's standing with his side toward the pulley, the stump being drawn towards the midline of the body. If the patient is at home the exercise can be carried out by allowing the cord to pass over the back of a chair upon which somebody is sitting to steady it (Diagram 12B).

### Arm Amputations

Arm stumps are not weight-bearing, and are subject to quite different strains and stresses from those of the lower limb. Long arm stumps are not so liable to circulatory disturbance, except the very long ones which are produced by disarticulation through the wrist and elbow. The ideal length of an upper-arm amputation in an adult is 8 to 9 in., measured from the tip of the acromion process to the amputated end of the humerus. If the stump has of necessity to be made shorter, at least half an inch of humerus should be left below the axillary fold, thus enabling good control to be maintained over the artificial arm.

If a still smaller length has to be fashioned, every endeavour should be made to leave some part of the head of the humerus. The scar should not be on the anterior or posterior aspect of the stump because pressure is exerted on these surfaces in using the arm. A terminal scar from equal anterior and posterior flaps is ideal, with again little tissue in the flaps and a conical stump. Adhesions of the musculature to the end of the humerus must be avoided. This latter consideration is the chief objection to guillotine operations, which are otherwise satisfactory.

The length of the lower-arm amputation is measured from the tip of the olecranon to the amputated end of the ulna, and should be about 7 in. with the elbow flexed. The radius should be at least half an inch shorter than the ulna to obviate cross-union, and a conical stump be produced for the comfort of the patient and to permit him to use the prosthesis. The scar should be terminal in a line across the ends of the bones, and the flaps should contain no superfluous tissue. The nerves must be cut across cleanly to avoid the "phantom hand."

If an amputation has to be carried out with a shorter length than that suggested above, it will not prevent the amputee from using an artificial arm if at least three and a half inches is allowed to remain, but in such a case more muscle tissue must be trimmed away and a real bony stump left. If as a result of an accident, disunited fracture, or other cause a surgeon is confronted with a disarticulation of the elbow- or wrist-joint, an ideal site amputation is preferable, because these disarticulations do break down repeatedly. Furthermore, artificial arms must have a rotary mechanism at the wrist, and an above-elbow prosthesis will have the elbow-joint together with a rotary arm mechanism. These points are often forgotten when disarticulation amputations are performed.

In all arm amputations the patient should be encouraged to use the proximal joints and truncated muscles as early as possible. Crêpe bandaging with 3-in. bandages is used when the stitches are removed. An arm amputee usually has a more despondent outlook than a leg case. It is for this reason that such cases should be fitted with prostheses as quickly as possible, otherwise there is a tendency to rely too much on the remaining hand. An arm can in the average case be fitted and used within a month of the operation.

Amputations of parts of the hands which have suffered trauma are indeed difficult. If any two working digits, or the thumb or part of it with a digit, can be saved it should be done to form the basis of a working hand. It is, however, surprising what appliances can be fitted to mutilated hands which may have only the minimum of a digit.

### Amputations in Children

Children may have a limb amputated as a result of trauma, bone disease, congenital deformation, or aerial bombardment. These cases should all be treated early, for a child will quickly learn to use a leg or an arm with great ability. A plaster pylon or peg-leg should not be advised for the use of a child.

### Summary

Records compiled by the Ministry of Pensions during the past 25 years definitely show that periodic examinations of amputated stumps are desirable.

The most suitable and trouble-free lengths of stumps, the position of the resultant scar from correctly fashioned skin flaps, and the treatment of the severed nerve are indicated.

In the past, stumps have received but little supervised attention with regard to their preparation for the fitting of a prosthesis.

A new method of crêpe bandaging is now used, the results of which prove its efficacy in reducing the oedema in a much shorter time than by previous methods. Pylons are not necessary, generally speaking. A course of exercises assists in preparing the stump musculature to control the artificial limb.

Arm amputations, not being weight-bearing, necessitate a different position for the scar. The stumps require bandaging and exercises to encourage the greatest range of joint mobility. The artificial arm should be fitted as soon as possible.

Children should not be fitted with non-articulated peg-legs. They should have a prosthesis at an early age, whether they be arm or leg cases.

# RENAL IMPAIRMENT DUE TO CRUSHING LIMBS IN ANAESTHETIZED DOGS

BY

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F. R. WINTON, M.A., M.D., D.Sc.

Impairment of renal function in dogs under nembutal anaesthesia ensues immediately after a period of 4 to 5 hours, during which both hind limbs have been tightly bound with rubber tubing from ankle to hip and the thigh muscles compressed in a vice and hammered for a few minutes. Removal of the bandage is followed by a large fall in arterial pressure, and by either anuria or severe oliguria. In the latter event the urine is deeply pigmented, presumably with myohaemoglobin, which is freely excreted by the normal kidney, and the creatinine clearance is very low, which might be attributed in part to the low arterial pressure. Restoration of the arterial pressure with intravenous gum-saline or ox serum usually initiates or increases the urine flow; but even if the flow is raised to its initial value with diuretics the creatinine clearance, and therefore the concentrating power of the kidney, recovers to only about one-quarter of its original value.

The low arterial pressure following release of the limbs is not responsible *per se* for the damage to the kidney, since maintenance of even a lower blood pressure for an hour by means of a histamine infusion does not involve reduction in creatinine clearance during a subsequent period at normal arterial pressure. The reduction in urine flow after release of the limbs does not in itself account for the renal damage, since prevention of this reduction by diuretics does not materially affect the degree of the ultimate damage.

The damaged kidneys respond to large doses of diuretics with large increases in urine flow but only small increases in creatinine clearance, which may reach about one-half the normal value. In these respects we did not detect a significant difference in the efficacy of intravenous administration of hypertonic sodium chloride, isotonic sodium chloride, sodium bicarbonate, or sodium sulphate. The depth of colour of the urine from damaged kidneys was not consistently related to the severity of the damage as indicated by fall in creatinine clearance. The nature of the pigment was not examined in this series of experiments. Dr. Rimington has, however, identified the pigment in urine secreted under similar conditions in a later series as mainly myohaemoglobin.

Post mortem there was extensive injury to and oedema of thigh muscles, but no fracture of bones. The kidneys showed a brown cortex and a distinctively bluish-pink medulla, often with a narrow light-coloured zone between the two. The kidneys were notably flaccid, in contrast with the tense kidneys normally found after experimental poisoning.

Microscopically, the kidneys were characterized by the presence of material within the lumina of the tubules which might have been capable of blocking some of the tubules. The material was particularly concentrated in the terminal portion of the proximal convoluted tubules. The distal and collecting tubules were usually free and distended. There was, however, no consistent relation between the extent of the deposit and the impairment of renal function; and, indeed, extensive deposit occurred in some kidneys which were functionally undamaged. In the only dog in which the anuria could not be antagonized even by huge doses of diuretics there were mitochondrial changes in the proximal tubule cells, indicating the action of a poisoning agent.

### Discussion

In these observations on 21 dogs we used the reduction in creatinine clearance as the chief indicator of renal damage because, like the inulin clearance, it is probably a measure of the glomerular filtration rate in the dog unless there is leakage of

creatinine from the concentrated urine in the tubules back into the blood. The renal damage described above is probably not due mainly to *reduction in glomerular filtration rate*, because oliguria from this cause is associated with very high creatinine and low chloride concentration in the urine, whereas in these experiments the creatinine concentrations are low and the chlorides may be increased. Microscopically the damaged organ appears fairly vascular.

*Blockage of the tubules*, suggested as a possible factor by the appearance of the deposit in them, should produce a tense kidney, in contrast with the striking flaccidity observed in these damaged kidneys. The deposit does not appear compact enough, nor does it occur in a sufficiently high proportion of tubules, to lead one to expect that it could reduce the creatinine output to one-quarter. A more likely hypothesis would involve release of a *poison* from the damaged limbs that affects the *tubule cells* by increasing their permeability to creatinine, urea, and other substances which are concentrated by the kidney. These substances would diffuse from the concentrated solution in the distal parts of the tubules across the tubule walls to the blood in the venules. Hastening the flow of liquid down the tubules with diuretics should reduce the loss by leakage of creatinine and so increase the creatinine clearance, an expectation which accords with observation. The main objection to regarding this as a self-sufficient hypothesis is that poisons such as cyanide or mercury salts produce an increased urine flow, due to inhibition of water reabsorption, before they produce the anuria due to increased permeability. Correspondingly, organs poisoned in this way are usually tense. This is, however, not an insuperable objection to the view that the poison here in question affects the permeability mainly.

Such a poison might reach the tubule cells either from the blood stream or, if diffusible, from the lumen of the tubule. In the latter event the poison itself might well be a substance which is concentrated in the tubules, and act the more potently in virtue of its concentration. This possibility has, however, been excluded in the following way. Partial obstruction of one kidney by an increase of ureter pressure resulted in a fourfold concentration of urine (as evidenced by creatinine–U/P ratio) compared with the unobstructed side. If the toxic agent released from the limbs had been similarly more concentrated on the obstructed side the severity of the damage should have been greater on that side. In fact, the obstructed side, after removal of the obstruction, was, if anything, a little less severely damaged than the unobstructed side.

So far as available evidence goes, the injury to the kidneys in our series of dogs appears to be of the same kind as that in man after comparable prolonged crush injury to the limbs. The essential nature of the renal damage has not yet been determined, but the evidence suggests that the main factor may be concerned with increase in permeability of the renal tubules due to a toxic agent released from the damaged limbs, while there may be an additional factor involving reduction in the rate of glomerular filtration probably due to lowering of glomerular capillary pressure.

# VARIATIONS IN THE RESPIRATORY RHYTHM OF PROGNOSTIC SIGNIFICANCE IN MALIGNANT HYPERTENSION

BY

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Recently I drew attention to variations in the respiratory rhythm in a case of malignant hypertension in its terminal stages (Gunewardene, 1938). A similar type of respiration has been noticed in cases of meningitis (Hutchison and Hunter, 1929). The characteristic feature is that the respirations are grouped; in each group the initial excursion in the tracing is the largest, the subsequent ones getting smaller, until the movements cease for a moment. This means that the depth of the respiration gradually declines as in the waning phase of Cheyne-Stokes respiration. In that case, however, there was no period of apnoea.

This type of respiration is seen in the terminal stage of malignant hypertension when pronounced albuminuria, persistent hypertension, and extensive eye changes (haemorrhages, exudates, cotton-wool patches, oedema of the disks, etc.) are present. The patient is generally quiet and lies flat on the back without a suggestion of the breathlessness of the cardiac type which previously had been well marked. A little restlessness, not continuous, is often observed; he opens his mouth frequently and breathes as though he is yawning half-heartedly. Occasionally he is irrational. Sometimes there is maniacal excitement; at other times a little drowsiness suggestive of a uraemic state. Uraemic twitching or convulsions were not observed.

These variations in the respiratory rhythm in association with malignant hypertension have not been described before, so far as I can gather from the literature available in Ceylon. Their cause has yet to be explained. Are they due to cerebral oedema, or to the effects of toxins on the respiratory centre? Is the alteration in the chemistry of the blood responsible for them? Eyster has shown that Cheyne-Stokes breathing can be produced in dogs by a rise and fall of the blood pressure in the presence of raised intracranial pressure.

In the following case, grouping of respiratory movements similar to those in the case referred to above was noticed, but each group was followed by a period of apnoea. The tracing is unlike Biot's type, but resembles that of Cheyne-Stokes respiration with the waxing phase absent. The rhythm is irregular and the depth of the respirations varies.

## Case Report

The patient, a male sedentary clerical worker aged 42, was admitted on March 7, 1939, complaining of occasional occipital headache, giddiness on and off, and blurring of vision. He was lying quiet, but a few days previously he had been very dyspnoeic. Examination revealed the following characteristics. Heart: heaving apex beat—in fifth space, midclavicular line; second aortic + + ; no murmurs. The lungs were clear. Blood pressure: systolic 300, diastolic 180. The brachial and radial

arteries did not feel much thickened, nor did palpation suggest such high pressure. Pulse 78, regular. Urine: scanty; S.G. 1010; albumin 0.7%; no sugar. Fundi showed oedema of the disks; flame-shaped haemorrhages, exudates, thickened arteries, very congested veins. Blood urea, 224 mg. per 100 c.cm.; urea clearance, mean 7.26% normal.

Treatment consisted of venesection; administration of sodium nitrite, theominal, etc.

During his stay in hospital the blood pressure varied between 210/140 and 260/170 (not eliminating effects of drugs). He became somewhat irrational, yawned half-heartedly, and later became a little drowsy and quiet. Just before his death (under ayurvedic treatment) on April 7, 1939, he complained that he "couldn't breathe." The accompanying illustration shows the respiratory tracing (thoracic) of this case.

According to Harrison (1939), the carbon dioxide tension in malignant hypertension is abnormally low and patients with periodic breathing have arterial blood which is under-ventilated as regards oxygen and over-ventilated as regards carbon dioxide. It has also been shown that the administration of carbon dioxide abolishes periodic breathing. The fairly sudden transition of a dyspnoeic, sometimes orthopnoeic, patient into a condition of tranquillity would suggest that changes in the chemical constituents of the blood gases and the tissue fluids play a significant part in the production of periodic breathing and the cessation of dyspnoea.

## Summary

A form of variation in the respiratory rhythm associated with malignant hypertension is described.

There are changes in the periodicity as well as the depth of the respiratory movements.

These changes are of grave prognostic significance even when the patient does not look seriously ill, the duration of life in the cases described being not more than 6 weeks after their onset.

I gratefully acknowledge the co-operation of Dr. J. R. Blaze and Dr. Cyril F. Fernando, under whose care the patient was; also the kind services of the Physiological Department, Ceylon Medical College.

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# VACCINATION IN GLASGOW DOCKS

BY

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AND

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The following is an account of an investigation into the potency of vaccine lymph and the effect of vaccination on the sickness and industrial accident rates among Glasgow dock workers.

As a result of small-pox of a severe type occurring in Glasgow, the medical officer of health, on June 29, 1942, issued an appeal for mass vaccination of the city's population. Since the disease had presumably entered through the Port it was felt that every endeavour should be made to have dock workers vaccinated at once. At all times close co-operation is maintained between the city's health services and the Port Authority (Clyde Navigation Trust), so that the drawing-up and completion of the scheme here outlined naturally fell to be dealt with by us. The scheme was approved by the medical officer of health, the Clyde Navigation Trust, and the port regional director.

## Outline of Scheme

The first essential was to carry out vaccination promptly and with the minimum interference with the normal working of the harbour; secondly came the necessity of informing the dock workers of the need for vaccination; and, thirdly, conveniently situated vaccination centres had to be established in the Docks.

It was decided to utilize the existing gas-cleansing stations in each dock as vaccination centres and, on the day before the opening of the centres, to make use of a broadcasting van to explain the need for vaccination and to announce the time and place for workers to attend. This scheme answered extremely well, and over 60% of the workers in the Port of Glasgow availed themselves of the opportunity. The medical and nursing staff employed were directed to pay particular attention to the technique of vaccination as outlined by Sir Alexander Macgregor in his communication.

## Result of Vaccination

Of the lymph used 95% was supplied by the Government Lymph Establishment, the remaining 5% being from other manufacturers. Our impression was that the Government lymph was somewhat more potent, although all the other varieties gave satisfactory reactions. The follow-up of many of the workers was far from easy owing to the constant changes of working shifts and the movement of gangs of dockers from one dock to another as ships arrived and departed, and we, of necessity, had to satisfy ourselves with records of 1,000 out of the total vaccinated. The accompanying table shows under four headings the results we obtained. (A) Severe reaction evidenced by constitutional upset, enlarged axillary glands, fairly extensive localized reaction, with inflammation extending from the pock sometimes up to the shoulder and down to the forearm. (B) A normal vaccination pock with little or no constitutional upset. (C) An immune reaction sometimes described as the papule of immunity of Pirquet. (D) No reaction.

*Table showing Results in 1,000 Cases*

| | A (Severe) | B (Normal) | C (Immune) | D (No Reaction) |
|---|---|---|---|---|
| No. of cases .. | 121 | 719 | 102 | 58 |
| Percentage .. .. | 12 | 72 | 10 | 6 |

From the table it is evident that the lymph used was particularly potent, 84% of the cases showing severe or normal vaccinations and a further 10% an immune reaction due in practically every instance to a previous successful vaccination. The 58 cases which showed no reaction were all revaccinated, when only two showed an immune reaction.

## Effects on Industry

We feared that mass vaccination would interfere with the normal work in the harbour and thus slow down the national effort, but this has not been so. In fact, less than 3% of all classes of workers were off work on account of vaccination. The maximum period of incapacity was one week, the great majority being back at work within 48 hours. Scrutiny of the sickness rate among dockers, office staff, and Clyde Trust employees for the 28 days subsequent to vaccination showed no increase over the normal rate prevailing at this time of year.

The industrial accident rate has also shown no increase above the normal, despite the fact that many crane drivers, capstanmen, and winchmen were vaccinated successfully, and were plucky enough to continue at work despite very sore arms.

## Comments

A good previous vaccination scar was no guarantee of immunity. For example, one female who had five large foveated scars resulting from vaccination in infancy, and subsequently in 1921, had a very severe reaction.

Stout persons generally had much more severe local reactions than thin persons.

Elderly persons often showed severe reactions even although previously vaccinated.

Many suffered from a coryza, sometimes associated with sore throat, of about three days' duration from the 8th to the 11th day after vaccination. In no case was the coryza severe enough to cause incapacity for work.

Women reacted more severely than men in the same age groups.

We found that vaccination of the lower limbs caused much more discomfort than vaccination of the upper limbs.

Nine cases in our series showed a post-vaccinial rash; four of these were urticarial in type and associated with previous acne or scabies, three morbilliform, and two scarlatiniform. They all occurred between the 9th and the 10th day following vaccination and disappeared within 48 hours. We noted no case of papular urticaria, nor did any of the dock workers develop pustular rashes resembling small-pox. Neither did we see any case of post-vaccinial encephalitis nor any person who developed nervous symptoms following vaccination. Several cases showed a somewhat delayed local reaction to vaccination.

This investigation was made possible only by the willing co-operation of all classes of dock workers, and we wish to thank the medical officer of health, the general manager of the Clyde Navigation Trust, and the port regional director for permission to print this short review.

The Chadwick Trustees have arranged for the following public lectures to be given on Tuesdays at 2.30 p.m.: Oct. 6, at Royal Society of Tropical Medicine, 26, Portland Place, W., Sir Leonard Hill, F.R.S., "The Interrelation of Clothing and Shortage of Fuel in Matters of Health"; Oct. 27, at Royal Sanitary Institute, 90, Buckingham Palace Road, S.W., Mr. W. T. Creswell, K.C., "The Forensic Aspects of Wartime Public Health Legislation"; Nov. 10, at London School of Hygiene and Tropical Medicine, Keppel Street, W.C., Bossom Lecture by Miss Jocelyn Adburgham, "Land Settlement—Its Sanitary and Architectural Aspects and After-war Possibilities"; Nov. 24, at Westminster Hospital Medical School, Horseferry Road, S.W., Malcolm Morris Memorial Lecture by Sir Arthur MacNalty, "The Prevention of Tuberculosis in Peace and War"; Dec. 8, at Royal Society of Tropical Medicine, Dr. W. Norwood East, "The Differentiation, Prevention, and Treatment of Anti-social Behaviour Disorders." Admission to the lectures is free, and further particulars can be had from the secretary, Chadwick Trust, 204, Abbey House, Westminster, S.W.1.

# Medical Memoranda

## A Case of Adder Bite

Publication of the following history of a case of adder bite that we have treated recently is prompted by the query of Dr. C. W. Walker in the *Journal* of July 25 (p. 118).

### Case Report

A well-developed woman, aged 63 and weighing about 12 st., was bitten by an adder on June 30 while picking wild flowers on the roadside. Two punctures were made by the fangs on the dorsal surface of the web between the middle and ring fingers of the right hand. The bite was inflicted at 5 p.m., and a tight constriction was applied to the wrist about 7 minutes later.

When first seen by one of us (D. S.-J.) 20 minutes after the accident the patient was rather faint (probably from psychic shock) and the hand was swollen as far as the constricted wrist. The two small punctured wounds were incised to provide escape of toxin, and, after a few ounces of fluid (principally blood) had escaped, the constriction at the wrist was removed. Five hours later the whole arm was swollen and very painful.

By the following morning there was marked toxic cellulitis the whole way up the arm, extending to the shoulder and neck on the same side. The oedema of the loose tissues at the base of the neck was so pronounced as to suggest the presence of free fluid. Forty-eight hours after the bite the oedema had increased both in extent and in degree, the back of the hand was very puffed, and the patient was unable to flex her fingers. There was, however, no local reaction at the site of the punctures. The path of the lymphatics from wrist to shoulder was indicated by a series of wide areas of capillary haemorrhages into the subcutaneous tissues, the intervening areas in some cases seeming in comparison so white as to appear blanched.

Four days after the bite the oedema, though less in degree, had spread to the scapular region and upwards into the right side of the scalp. Slow improvement followed from now onwards, the patient being under treatment for 4 weeks. At the end of this time almost full recovery had taken place. All oedema had disappeared, but the muscles of the forearm were still a little thickened and the right side of the neck felt somewhat stiff. Constitutional symptoms were never very prominent, the temperature being 99° on the second and third days and normal from the fourth day onward.

In the absence of specific antivenene the treatment was merely palliative. At the outset coramine was given to combat shock, and sulphapyridine as a prophylactic. On the morning of the second, third, and fourth days the patient received 1 c.cm. of "S.U.P. 36" as a detoxicant. On the fifth and sixth days mersalyl was administered to relieve the oedema by promoting diuresis. In addition the whole limb was immersed frequently in warm iodine baths.

### Comment

Snake venoms contain two principal types of toxins—namely, neurotoxins and haemotoxins. Neurotoxins preponderate in venoms from cobras and mambas, while haemotoxins are found in the adders (vipers) of the Old World and in the rattlesnakes of the New World. Neurotoxin may kill rapidly by paralysis both of the medullary centres and of the peripheral nerves, sensory and motor, in the last action resembling curare. Survival is usually followed by full recovery without sequelae.

Haemotoxic venom damages by enzyme action the capillary walls, the lipoid membranes of the blood corpuscles, and the tissues themselves, resulting in extravasations of blood, haemolysis, and formation of histamine. If the patient should recover from the initial shock and collapse, of which histamine is believed to be an important cause, the perivascular haemorrhages resolve with the formation of much interstitial fibrosis. This fibrosis may affect all organs—liver, spleen, kidneys, heart—as well as the tissues in the immediate neighbourhood of the bite, and may result in chronic invalidism. Suppuration and gangrene, with repeated interruptions of healing, may occur at the actual site of injection. The prognosis depends on two factors: the amount and toxicity of the injected venom and the availability of specific antivenene.

The bite of the adder found in Britain is rarely fatal owing to the small dose and low toxicity of the venom injected. In the present case there were only local symptoms—toxic oedema and cellulitis, with haemorrhagic extravasations along the course of the lymphatics. The residual thickening of the muscles is presumably due to a slight degree of interstitial fibrosis.

D. Stanley-Jones, M.B., B.S.
Hayle, Cornwall. Charles E. S. Harris, M.B., Ch.B.

## Two Cases of Pontine Haemorrhage in Typhoid Fever

The complications of typhoid are so numerous that it has been truly said that the whole of medicine may be studied in one case. The following two cases reveal what appears to be a rare complication, as, apart from a brief note in Allbutt and Rolleston's *System of Medicine*, I have been unable to find any reference to it.

### Case Reports

*Case 1.*—A sergeant was admitted to a field ambulance on Sept. 30, 1941, and transferred to a general hospital on Oct. 3 with a history of continued pyrexia. On admission his temperature was 103° and his pulse 80; he was slightly delirious, so that his history of the onset could not be obtained. Blood culture gave a strong growth of *B. typhosus*. The disease, which was severe, ran a normal course till Oct. 6, when he had a profuse epistaxis accompanied by hiccup. When examined he was found to be semi-comatose, the pupils were pin-point, and all reflexes were absent. The temperature was 102.6°, and the pulse 84. The whole picture was that of a pontine haemorrhage, except that the temperature never rose above 103° and there was no glycosuria. His condition steadily deteriorated and he died 36 hours later. At necropsy the caecum showed gross typhoid ulceration almost amounting to gangrene, and there were numerous punctate haemorrhages scattered through the substance of the pons. There was, unfortunately, no record of when he had last been inoculated.

*Case 2.*—A dockyard worker was admitted to a general hospital on Oct. 30, 1941, and was diagnosed as suffering from enteric on the strength of continued pyrexia, papular rash, a rising titre to TO agglutinin, and the fact that he was one of a small group of eight, most of whom gave positive blood cultures to one of the enteric group. He had been inoculated with T.A.B. vaccine on July 15, 1941. Before admission he had suffered from severe headache, with slight neck rigidity, and on Nov. 1 it was noted that his pupils were pin-point and showed only slight reaction to light. He complained of diplopia at a certain angle, and there was a paresis of the left abducens nerve. Coarse tremor was present in the tongue and fingers, and the deep reflexes were brisk, including the jaw-jerk. The C.S.F. showed no pathological changes. On Nov. 11 he had a slight epistaxis. The disease ran a normal course, the temperature becoming normal about Dec. 15. However, on Dec. 29 he complained of a pain to the left of the sternum about the level of the fifth interspace. At operation a collar-stud abscess of the sixth costal cartilage was found, the pus from which gave a pure culture of *B. typhosus*. On Jan. 15, 1942, the pupils were pin-point, there was some weakness of the left lateral rectus muscle though diplopia was not complained of, all deep reflexes were brisk, jaw-jerk was still present, there was coarse tremor of fingers and slight tonic spasm in left arm and right leg but no mental changes. Unfortunately Service movements prevented a further follow-up.

### Commentary

By inference from Case 1 it is reasonable to conclude that Case 2 also had punctate pontine haemorrhages, but it is difficult to understand why this should have occurred. At the time of infection the two cases were separated by at least 100 miles; moreover, none of the others in Case 2's group showed any sign of cerebral haemorrhage, so that the action of a specially selective typhoid toxin does not appear to be feasible. Vitamin C deficiency is a possible explanation, though unlikely in Case 2 because the living conditions permitted of an ample supply of fruit and vegetables (an ascorbic acid estimation was not done). Failing these reasons, one is forced to conclude that there must have been some defect, histological or pathological, in the pontine capillaries and that the haemorrhages were analogous to the epistaxis which occurs in the early stages of some cases of typhoid fever—incidentally, in both the cases described.

D. C. Wilson, M.B., F.R.C.P.Ed.,
Surgeon Commander, R.N.V.R.

H.M. Stationery Office has published on behalf of the Department of Health for Scotland a 4d. pamphlet on the "Feeding of Infants and Pre-school Children" as a guide for use in wartime nurseries. It is commended in a foreword by Dr. Andrew Davidson, Chief Medical Officer of the Department of Health for Scotland.

# Reviews

## WAR SURGERY

*Surgery of Modern Warfare.* Edited by Hamilton Bailey, F.R.C.S. Compiled by 72 contributors. Volume II. Second edition. (Pp. 517; illustrated. 40s., plus 9d. postage.) Edinburgh: E. and S. Livingstone. 1942.

The first edition of this work appeared in parts which were completed in July 1941; the second consists of two volumes, the earlier of which appeared in May 1942 and was noticed in the *British Medical Journal* of June 27, 1942, p. 792. The second volume is now in our hands and comprises articles by thirty contributors, among whom it is pleasing to note that interspersed among the admirals and generals who have come down from the last war are quite a number of the younger officers of this. This work is a really fine effort on the part of its editor to keep those practising war surgery abreast of the most recent developments and provide them with an up-to-date reference book of a thoroughly practical character. So many books appeared early in this war which were largely reminiscences of the last, and were almost out of date as soon as they were published. An exception to such a criticism is this book of Mr. Hamilton Bailey's, produced with that high standard which we have come to associate with all the textbooks he edits, written by those with special experience of the various subjects which they consider, and brought up to date by a critical editorial supervision. The second edition shows many improvements over the first.

Volume II of this second edition comprises sections ix to xx, and among the subjects dealt with are burns, wounds of bones and joints, wounds of the hand and foot, peripheral nerve injuries, and amputations. There are also articles on administration, on surgical diseases encountered in subtropical countries, on oto-rhino-laryngology in relation to war injuries, and on wounds of the eye and orbit. An appendix on very recent developments is particularly valuable: as an instance may be cited the article (p. 961) in which recent correspondence on the use of ligature and suture materials of cotton and thread is briefly but adequately discussed. This section, for which the editor himself is responsible, is full of useful information that brings the work right up to date. The production of the volume is excellent, the type clear, the references are full and easily found at the end of the chapters or as footnotes to the appendix, and the illustrations are many and well reproduced.

## HANDLING OF CHROMOSOMES

*The Handling of Chromosomes.* By C. D. Darlington, F.R.S., and L. F. La Cour. (Pp. 165. 8s. 6d.) London: George Allen & Unwin, Ltd. 1942.

It is difficult to avoid the appearance of extravagance in praising this perfect specimen of what a laboratory manual can be at its best. Only masters of a subject could reduce to 165 small pages what others might well be unable to present in less than an indigestible encyclopaedia of four times the size. Only artists could achieve such elegance of presentation. Only publishers with a soul would in these difficult times do full justice to the book in the shape of good paper, clear print, attractive arrangement, and superb plates; all, moreover, at such an astonishingly low price.

We are reminded that although the cell nucleus was discovered and named by Robert Brown in 1831. it was not till fifty years later that the chromosomes were seen. To-day it is known that they are the chemical organizers of life. It is in terms of their structure, behaviour, and functions that we must study reproduction, heredity, and development. The genes are among the largest molecules that the chemist has studied and at the same time they are the smallest living structures whose behaviour can be observed. In the teaching of biology. whether at school or university, there is nothing else which it is more important to demonstrate, or, what is far better, help the learner to study for himself. In this small volume every stage of treatment is dealt with from the collection of suitable plant and animal material to the drawing and photographing of the finished preparation. The authors have described relatively simple methods in careful detail, and nothing is omitted; to quote one example, there are tables showing the appropriate material for demonstrating the various structures and processes and showing also what is available month by month throughout the year. The apparatus described is as modest as is consistent with obtaining successful results.

It would be a dull student indeed who would not be impatient to start work as soon as the book was placed in his hands. But this is more than a manual for students. Research workers will find indications as to when and how more elaborate methods should be used. They will also find a most useful bibliography of recent reviews together with much information, some unpublished hitherto, which has never before been collected in a single volume.

## ADVANCES IN PATHOLOGY

*Recent Advances in Pathology.* By Geoffrey Hadfield, M.D., F.R.C.P., and Lawrence P. Garrod, M.D., F.R.C.P. Fourth edition. (Pp. 346, with 35 illustrations. 18s.) London: J. and A. Churchill, Ltd.

"Garrod and Hadfield" is fast earning a place as the most important of the volumes in the "Recent Advances" series which began in 1924 with "Beaumont and Dodds." So much has happened in the four years that have passed since the publication of the third edition in 1938 that the authors have found it necessary to rewrite the greater part of this, the fourth edition. It is, indeed, becoming a commonplace for authors now revising books after an interval of four or five years to observe that the advances made in medicine through this period have been spread over such a wide field as to call for an almost complete revision of their work. We have clearly been through a period of almost unexampled activity, and can only hope that the war will at least provide a testing ground for much that is new, and not destroy the ferment that is at work in the mind of medicine.

The subject of inflammation is now dealt with in two chapters instead of one—welcome evidence that pathologists are looking afresh at fundamental problems which many people have looked upon as comfortably solved in standard textbooks. New chapters are given to vitamin deficiency diseases, to essential hypertension, to extrarenal azotaemia, and to crush syndrome. A new chapter on certain aspects of the pathology of the ductless glands has been contributed by Dr. E. F. Scowen, and there are new observations on such subjects as cancer, rheumatic fever, pneumonia, regional ileitis, and lipoid pneumonia. Messrs. Churchill are to be warmly commended for the admirable way in which they have produced this volume at a time when medical and scientific publishers do not receive the encouragement they should from the paper controller. We would draw special attention to the excellent half-tone reproductions. Anyone who wants to understand "the new pathology" cannot do without "Garrod and Hadfield."

# Notes on Books

The publication of a fifth edition of Mr. A. P. Bertwistle's *Descriptive Atlas of Radiographs: An Aid to Modern Clinical Methods* three years after the fourth indicates that there is a demand for this kind of atlas. It is a pity, therefore, that the opportunity was not taken to replace many of the older illustrations by ones of modern quality. This is the most important defect in the volume, that many of the illustrations are representations of the radiology of twenty years ago. There is a certain flamboyance in the preliminary matter in this book which the editor would be wise to curb in future editions. For instance, the remarks on the cancer campaign have little bearing on the main subject of the book, nor has the question "Is Abortion justified?" in the legend to the frontispiece. The section "Milestones in Radiology" will be of interest to those acquainted with the history of *x*-ray diagnosis. The publisher is Henry Kimpton and the price 42s.

A second edition has now appeared of Dr. R. D. Lawrence's useful pamphlet *The Diabetic A B C Wartime Supplement*; it is published at 9d. by H. K. Lewis and Co.

Dr. Margaret Dobson's *Binocular Imbalance* (H. K. Lewis and Co.; 10s. 6d.) is partly a restatement of elementary facts concerning binocular vision and partly an account of her personal practice in the diagnosis and correction of its disorders. It is of value in so far as it brings into a comprehensive scheme such new developments as dynamic retinoscopy, anaglyphs, and variable prism stereoscopes. There is much that is new in this monograph, but how much of this can be incorporated into actual practice is not at all clear.

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## INFLUENCE OF OCCUPATION AND ENVIRONMENT ON MORTALITY FROM PHTHISIS

The conditions under which the majority of the population live and work have been steadily, if slowly, improving during the present century, and during the past decade particular attention has been paid to social and environmental conditions. The reforms that have been introduced have been a large factor in bringing about the reduction in the rate of mortality that has been experienced during the past fifty years. Factors influencing health may be divided into two main headings—constitutional and environmental. The latter may be broadly subdivided into occupational and social risks. A distinct line between these two subdivisions cannot be drawn, because the social or economic environment is largely conditioned by the occupation followed. If the place of work or the rate of pay forces a worker to live in unhealthy conditions the extra risk involved must be attributed to occupation and may be regarded as an indirect occupational risk. In the past, crowding of the population in a small area around the works was common, and examples of this can be found in the coal, textile, and heavy industries. The occupational mortality section of the Registrar-General's decennial supplements have for years provided valuable information for comparative purposes. Although some diseases can be readily classified as specific risks inherent in the industry, such as chronic poisoning by lead and phosphorus, or due to the cumulative effects of long exposure leading to such morbid conditions as pneumoconiosis in anthracite miners and mule-spinner's cancer, our present knowledge of the occupational risk is imperfect. The method of selecting recruits varies from industry to industry; some occupations demand a high standard of physique and some impose no standard. The importance of selection must be stressed, and because the death rate of a particular occupation is high it cannot be inferred that the trade is inimical to health, because the excessive mortality may be due to indifferent physique allied with a low economic standard and poor domestic conditions.

Hay was the first to attempt to differentiate between the occupational and the environmental risk. He used the experience of the city of Aberdeen during the ten years 1900-9, and compared the phthisis death rate among males in twelve occupations with that of wives and widows and the unmarried children of men who followed these occupations; they were exposed to the environmental but not to the occupational risk. His data showed that the phthisis rate was much greater among males than among the wives and widows; the range was 1.1 to 5.7 for males and 1.1 to 2.1 for wives. Within the limits of his data, which Hay recognized, it would appear that the risk of phthisis in the occupations with a high mortality was of a direct occupational nature, as the married women showed no corresponding excess. Cheeseman,[1] in an interesting paper, has pursued this line of investigation over a wider range of occupations. His observations are based on the data published in the Occupational Supplement of the Registrar-General for 1930-2, and, as for Hay's data, the male mortality was based on the experience of all males, married and single. The occupations of the males were divided into five groups according to whether their standardized mortality ratios from pulmonary tuberculosis were (1) significantly greater, (2) probably significantly greater, (3) not significantly different, (4) probably significantly less, (5) significantly less than the ratio for all males. The standardized mortality rates for wives were similarly subdivided. A combination in any occupation of a significantly greater mortality for males with a mortality for the wives significantly less could be taken as evidence that the direct occupational was more important than the environmental risk. No such occupation was found. Hairdressing was the only occupation with a significantly excessive male ratio associated with a ratio for wives that was probably significantly smaller than that for all married women. Altogether 43 occupations were studied, and of the 19 occupations in which the male phthisis was in excess there were 10 in which the wives had a similar experience and 2 in which the values for the wives were subnormal. In 17 occupations the male experience was below normal, and for 15 of these the ratio for wives was either equal to or in defect of the average for all wives. From the data examined it was concluded that the direct occupational risk could not be differentiated from the environmental, possibly because of imperfections in the statistics.

The failure to distinguish easily between the occupational and the environmental risk emphasizes the importance of the social and economic aspect. A great rebuilding programme will have to be faced after the war, when the housing problem will be acute; it is essential that the relation which exists between the home environment of the workers and mortality should be given full consideration. And however "ideal" the home may be it must be remembered that the size of the rent must not be such as to leave insufficient money for the purchase of proper food and clothing. The relation between social and economic environment and respiratory tuberculosis can be shown by considering the five social classes of the Registrar-General. Mortality increases progressively as the social class decreases. Taking the standardized mortality ratio of all males aged 20–65 as 100, the standardized mortality ratio of social class I is 61 and for social class V 125. The corresponding figures for married women are 52 for social class I and 132 for social class V.

[1] *J. Hyg.*, Camb., 1942, **41**, 463.

## SHOCK TREATMENT IN PSYCHIATRY

The last decade has seen remarkable progress in the physical treatment of the psychoses. A short time ago it was only the increasingly rare cases of general paralysis that offered us the opportunity of effective intervention and cure. Out-patient departments were combed for hopeful cases of neurosis, where the healing art in the form of psychotherapy might be brought to bear with some prospect of success. Even the most recent case of schizophrenia or affective psychosis received only a symptomatic and expectant form of treatment, relying exclusively on the vis medicatrix naturae. The situation is very different to-day. Acute psychoses of recent onset now present the most favourable clinical material we have; and the much wider experience of neurosis in all its forms which has been forced on us by the war has convinced many previous enthusiasts that neurosis, whether inborn disposition or environmentally determined habit, is more often than not an extremely refractory therapeutic problem.

A recent manual by Drs. Jessner and Ryan[1] marks this change of attitude, and describes the therapeutic techniques by which it has been brought about. Insulin treatment of schizophrenia and convulsive treatment of depression have obviously come to stay, at least until still more effective measures have been devised. Their efficacy has been and continues to be energetically debated; but the statistical evidence which has been accumulating now for more than seven years approaches more and more nearly to unanimity in their favour. It is now time that every physician concerned with the treatment of psychotic patients should be familiar with their indications, technique, and complications; and this book provides a valuable step towards a more general education in this direction. Treatment is worth while, and it is essential that it should be properly planned. The expectation of life for a schizophrenic of twenty-five years is about thirty years, which if spent in hospital will cost the community about £1,700. The annual incidence of schizophrenia is large enough (over 2,000 in 1932 in England and Wales), and the prospects offered by treatment are favourable enough, to make any adequate acute treatment centre a communally profitable enterprise. On the other hand, the results obtained by haphazard playing around with insulin and convulsion cannot be compared with those obtained by system and planning.

The usefulness of these physical methods of treatment emphasizes the kinship of psychotic with general medical illness. We are not deterred by fear of relapses from treating tuberculosis, diabetes, and cardiac disorder by the best methods we know, and the same attitude should be more general in psychiatry. There should be the same degree of discrimination and clinical judgment in the prescription of treatment in psychiatry as in general medicine. As it is there is a tendency to regard convulsive therapy as a cure-all, or something that must be tried in every case. The wide introduction of the simple, foolproof, and inexpensive electrical apparatus into psychiatric hospitals and out-patient departments all over the country is both the welcome sign and the cause of increased therapeutic interest; it is likely that as a result many patients will be spared months and even years of misery and illness. But therapeutic enthusiasm can be uncritical. Not so long ago[2] we stressed the need for agreement upon both diagnostic and prognostic standards, and for statistical analysis. Until this agreement has been secured we must beware against being misled by "clinical impressions." The method is being employed for the treatment of such refractory material as the chronic obsessional, and, because the proper facilities are lacking, for the early schizophrenic. This latter use instead of insulin is, except in the rarest cases, really disastrous; for it induces a fallacious feeling of well-directed effort, when at best it secures only some symptomatic improvement, more usually wastes valuable time, and not infrequently does actual harm. The administration of convulsion therapy often clears up depressive symptoms in a variety of syndromes—organic, schizophrenic, and reactive—as well as in the typical endogenous and involutional melancholias. On the other hand, it is rather ineffective in the treatment of thought disorder, paranoid symptoms, and depersonalization. In so far as these symptoms depend on a fundamental depression, they may clear up too; but if separately determined they are likely to be but little affected. Nevertheless, while convulsive treatment is being more and more actively employed, insulin treatment is being relatively neglected. The reason for this is probably nothing more than the great difference in administrative and technical difficulty of the two methods. But the tendency is to be regretted. For the depressive, for whom convulsive treatment can do so much, is likely to recover eventually, treatment or no treatment; while the schizophrenic, if he is deprived of insulin treatment in the earliest months of the illness, faces a high probability of progressive deterioration and life-long asylum care. It is to be hoped that the very practical manual of treatment by Jessner and Ryan will do something to remedy this undesirable state of affairs.

1 *Shock Treatment in Psychiatry: A Manual.* By Lucie Jessner, M.D., and V. Gerard Ryan, M.D. William Heinemann. (17s. 6d.)
2 *British Medical Journal*, 1940, **2**, 526.

## PROGNOSIS IN REGIONAL ENTERITIS

Diseases of the small intestine present problems not easy to unravel. In an article in this *Journal* in 1913 T. K. Dalziel,[1] describing nine cases of "chronic interstitial enteritis," ended with the words: "I can only regret that the aetiology of the condition remains in obscurity, but I trust that ere long further consideration will clear up the difficulty." In 1933—twenty years later—P. W. Brown in America suggested the title "regional enteritis" for this same condition, which a year before Crohn had described and to which his name has since been widely given. Now, almost thirty years later, Brown, summarizing with C. J. Donald[2] a total of 178 cases already seen at the Mayo Clinic, is still forced to write: "We deplore the fact that we have no knowledge of the aetiology of the disease." But we at least now have many accurate and detailed reports of its symptomatology and pathology. Briefly stated, the condition is characterized by abdominal pain, diarrhoea, fever, anaemia, development of fistula, loss of weight, nausea, and vomiting. Many cases resemble, and are operated upon for, acute intestinal obstruction, which may often in fact occur. Other cases are mistaken for acute or chronic appendicitis, ulcerative colitis, ileo-caecal tuberculosis, actinomycosis, or nervous diarrhoea. In some patients a mass develops in the right iliac fossa, though this is in fact a late occurrence. Earlier, the intestine is thickened and oedematous, with rigidity, adhesions, abscess formation, or fistula. The mesentery is thickened and shows hyperplastic glands; N. C. Tanner,[3] writing recently in this *Journal*, emphasizes these changes as of particular importance in both treatment and perhaps causation.

From Brown's series of cases a number of interesting conclusions can be drawn, though he is unable to throw much fresh light upon the condition. In prognosis, with which he is specially concerned, he stresses once more the seriousness of the condition, which tends to progress by remissions and exacerbations, and to spread both up and down the intestine from its point of origin. In 92% of Brown's cases this was in the terminal ileum (ileitis), but it may be at any point in the small intestine. As the disease progresses, increasing nutritional defect may arise and in advanced cases gross failure of absorption occur. At present we do not know how to prevent the condition, and the only effective treatment is surgical. No medical treatment is more than palliative, though the value of a high protein diet with additional vitamins is undoubted both before and especially after operation. Brown stresses the need for adequate supplementary supplies of the vitamin B complex.

The results of treatment depend upon several factors—one of which at least would appear to be the thoroughness of the operation. The more radical the excision of the

1 *British Medical Journal*, 1913, **2**, 1068.
2 *Amer. J. digest. Dis.*, 1942, **9**, 87.
3 *British Medical Journal*, 1942, **1**, 739

inflamed intestine and the diseased mesentery, the more hopeful appears to be the prospect. When further resections are necessary after the first attempt the mortality is high, and Brown records only 14 of 23 patients so treated as surviving. Short-circuiting alone may dramatically relieve—and even appear to cure—the condition for a time, and in an acute phase this is often all that can be done. In the more chronic stage, however, immediate resection may be possible or a deliberate two-stage operation be performed. Brown's figures suggest that a two-stage is better than a one-stage operation. Colp, Garlock, and Ginzburg,[4] however, reporting 40 cases treated by ileocolostomy with exclusion, record no operative mortality and recession of the disease in the excluded loop in a high percentage; at the same time they emphasize the importance of dividing or excluding the ileum well above the apparently diseased area, because the proximal few feet of gut above the lesion may be involved even though appearing to be normal. In Brown's opinion short-circuiting alone offers success in less than 50% of cases, and he notes that the necropsy records at the Mayo Clinic reveal no instance of healed chronic regional enteritis. At the time of his report, only 14 out of 45 short-circuited patients were well, and half of these had in fact been in bad health within a few years of the operation. In his opinion such patients should be kept under observation, and even when the patient is in apparent good health it is wiser to resect the gut rather than wait until an exacerbation of the disease makes this both more dangerous and more imperative.

The continuance of anaemia, failure to gain weight, and diarrhoea are ominous signs, especially after operation, though persistent diarrhoea is a frequent sequel of ileocolostomy and not alone of serious significance. The importance of careful and, if necessary, repeated radiological examination in obscure cases presenting symptoms such as these needs little emphasis, and has been recently mentioned in an account of two cases by Pratt and Simpson,[5] who also recommend the adoption of a two-stage operation in treatment. In over 70% of Brown's series positive evidence of disease was given by *x*-ray examination—the great majority by means of the barium enema. If the condition begins, however, above the ileum, even a careful barium meal examination is likely to miss it at first, but fortunately less than 10% of cases arise at any site other than the lower ileum.

Bearing, therefore, the possibility of the disease in mind, and with the aid of skilled radiography, early diagnosis should be more common; combined with this, radical and determined surgery may legitimately be expected to improve the prognosis and the, at present, high mortality, which was approximately 10% in Brown's 178 cases.

## A GREAT EPIDEMIOLOGIST

Those who had the privilege of Dr. Wade Hampton Frost's friendship will need no reminder of the pain his premature death caused. A still wider circle who have read a most judicious and well-edited selection of his papers[6] will realize that the world has lost a great investigator and teacher. These papers mirror the evolution of epidemiological science in a sagacious, critical mind; the image is sharp because Frost had command of an admirably clear and scholarly prose style.

The earlier papers are models of descriptive epidemiology; sound and accurate official reports. Few become first-rate epidemiologists who have not had the discipline of reporting to superiors apt to prefer literal accuracy to scientific imagination; Frost had had the additional advantage of experience in country practice. Epidemiology is indeed the study of groups, not individuals, but it is well to know something of the characteristics of the individuals merged into groups. The papers on typhoid fever in Williamson and septic sore throat in Baltimore belong to this period, which ends with the elaborate report on poliomyelitis in Iowa. Frost was conscious of the difficulty of a complete enumeration of group characters, because of the protean clinical manifestations of the disease, and soon to face the difficulties in an even worse form. The next group of papers had their origin in the apocalyptic events of 1918-19, the great influenzas. He was faced by problems which could not be solved by analysis of official and ostensibly exhaustive data. One may register deaths on a nation-wide scale, but hardly illnesses, at least with enough particularity to satisfy a critical mind. So one has recourse to sampling, to the intensive study of selected groups. This involved a more elaborate statistical technique than exhaustive enumeration, and Frost steadily widened his biometric knowledge. He had the good fortune to be associated at Johns Hopkins (from 1919 to his death) with such biometricians as Lowell J. Reed and the late Raymond Pearl and, without ceasing to be primarily an epidemiologist, gave proper weight to statistical considerations. It is not that his papers became more statistical in the sense of including more tables of figures—actually the later papers have fewer tables—but they become more quantitative in the best sense of the word; the numerical analyses *tell* more. This increased power of handling data quantitatively is seen when he returns to the relatively simple problem of diphtheria in Baltimore—absolutely complex but without the horrifying complexity of influenza. The deduction of a *measure* of decreasing incidence in a partly immunized population is skilful and yet simple. Similarly, the paper on familial aggregation of infectious diseases is an excellent appraisement of a method suggested by Chapin.

In his last years Frost turned to the epidemiology of long-term infections, particularly of pulmonary tuberculosis, having perceived the importance of an actuarial method of analysis. A comparison of these papers with those of very good writers a generation earlier will enable the reader to appreciate the immense improvement of technique which the method of sampling, properly controlled, has made possible. It may be said—undoubtedly Frost himself would have said—that none of these papers chronicles a dramatic revelation like that of Frost's great hero, Dr. John Snow. The problem of poliomyelitis is still not completely solved; that of influenza still challenges us. Yet the oft-misused adjective "great" is fairly applicable to Frost's achievements. By precept and example he raised the level of epidemiology as a branch of medical science, bringing it into a position to command the respect of contemporaries. His loss must be felt for years, but he built so well that the school he founded at Baltimore will surely continue to be one of the focal points of epidemiological education.

## LOW PHOSPHORUS DIET AND EXPERIMENTAL RICKETS

Rickets may be the bane of the paediatrician and social welfare worker, but by the interest which it has aroused among biochemists it has added considerably to our knowledge of biological processes and not least of the part played by phosphorus, an element which makes its presence

4 *Amer. J. digest. Dis.*, 1942, **9**, 64.
5 *British Medical Journal*, 1942, , 634
6 *Papers of Wade Hampton Frost, M.D.: A Contribution to Epidemiological Method.* Edited by Kenneth F. Maxcy, M.D. New York: The Commonwealth Fund; London: Oxford University Press. ($3.00 or 16s. 6d.)

felt in many biochemical dramas. In order to describe the physiological significance of an indispensable nutrient, observations must be made on suitable animals restricted to diets extremely deficient in the element to be studied but adequate in other respects. While this method has been often employed with lime and other minerals it has not hitherto been effectively used for phosphorus. It is true that the cereal rachitogenic diets introduced by Sherman, McCollum, and others produce a phosphorus deficiency in the growing animal owing to the fact that much of this element is present as phytin, which varies greatly in its digestibility. This, however, introduces a factor of uncertainty, and in a recent series of papers[1 2 3 4 5] from different laboratories in the U.S.A. some attention has been paid to the preparation of diets containing a very small amount of total phosphorus, approximating to an absolute deficiency. These diets with and without an associated vitamin D deficiency have been used in experimental work on rats and puppies and have yielded conflicting but interesting results.

Within a few weeks progressive deterioration in the general health of the animals (rats) was apparent. The coats became rough and greasy, muscular activity was diminished, and ultimately walking, standing, and even breathing became more difficult and painful; examination of the skeleton revealed extreme rarefaction. In the earlier phases the metabolic and clinical manifestations of rickets were produced when vitamin D was absent from the diet. The results of adding this vitamin to the food varied with different workers. Schneider and Steenbock[1] found that rickets was prevented in rats, but Zucker and his colleagues,[4] while agreeing that there was no naked-eye evidence of rickets, observed that a supplement of vitamin D was incapable of maintaining the normal mineral composition of the bone. In puppies, on the other hand, Freeman and McLean[5] found that on a low-phosphorus diet florid rickets was produced whether or not the vitamin was given. It is obvious that there is a species difference. Zucker, however, stresses the fact that the absence of anatomical signs of rickets does not necessarily indicate normal ossification. This, of course, is of great interest in the ever-recurring discussion on the criteria of rickets in the infant. It is generally agreed that the *x* ray is more effective than clinical examination in detecting mild degrees of the disorder. The question arises as to the desirability of using biochemical tests such as an increase in plasma phosphatase as a diagnostic indication even when there is neither clinical nor radiographic evidence. Freeman and McLean[5] studied the distribution of phosphatase by histological methods. From their sections there appears little doubt that osteoid tissue is devoid of phosphatase, which is found in abundance wherever osteoblasts are abundant. There is clearly room for further work on these lines, especially to determine whether there is any relation between the bone phosphatase and the concentration of this ferment in the plasma.

Some interesting facts are available with reference to the interchange of phosphorus between bone and soft tissues. According to Schneider and Steenbock,[1] the addition of vitamin D to a low-phosphorus diet, while preventing rickets and causing an increase in serum phosphorus, led to a complete inhibition of growth. They suggest that the anti-rachitogenic effect is due to the stimulating effect of vitamin D on phosphorus utilization in the skeleton, thereby depriving the soft tissues of their quota of this element. Day and McCollum,[3] on the other hand, found that, despite an actual loss of phosphorus from the body, growth continued for some weeks. As the percentage content of phosphorus in the non-osseous tissues remains constant, it would appear that, contrary to the conclusion of the other workers, phosphorus is diverted from the bone to the soft tissues even when there is an absolute deficiency. This utilization of bone phosphorus is, however, very inefficient, as a great loss of body phosphorus occurs. Curiously, the faeces accounted for practically all the phosphorus loss, whereas three-quarters of the ingested calcium was voided in the urine. These results may be considered with the finding that in puppies with low-phosphorus rickets there was actually a hypercalcaemia. In spite of the increase in serum calcium the calcium–phosphorus product was reduced, indicating a slight undersaturation of the serum with calcium phosphate. It is easy, therefore, to understand why there is little calcification and why, with adequate absorption of lime, there is excessive urinary output.

So far, low-phosphorus diets have been exploited only for the study of mineral deficiencies allied to rickets. There still remains the exploration of such fields as parathyroid activity, the problem of phosphorylation in connexion with carbohydrate metabolism, and the absorption and excretion of lead and other substances.

1 *J. biol. Chem.*, 1939, **128**, 159.
2 *J. Nutrit.*, 1939, **17**, 601.
3 *J. biol. Chem.*, 1939, **130**, 269.
4 *J. Nutrit.*, 1941, **22**, 139.
5 *Arch. Pathol.*, 1941, **32**, 387.

## A WORD TO CORRESPONDENTS

Once again readers are urged to keep check on their pens. The paper situation is very difficult, and we see no prospect of an adequate supply. In March last our meagre ration suffered a drastic cut, which leaves the *Journal* with little more than 50 pages a week for all the purposes of a professional organ of information and opinion serving 41,000 members at home and abroad. Advertisements are cut down to a bare minimum; the size of type has been reduced to the limit of comfort if not of legibility; and rigorous economy of space is exercised in every direction. Meanwhile, the inflow of articles and letters has grown apace. It is natural that members should want to express themselves on urgent questions of the day, and one of the *Journal*'s functions is to give them the means for doing so. But the growing restriction on paper supplies makes it impossible to print more than a small proportion of the many letters received or to acknowledge and return those that cannot appear. Correspondence on medical planning, on a State Medical Service, and on certification has far exceeded the space available, and still the letters come by every post. We do not like to disappoint those who commit their thoughts to writing in the rare leisure of a busy life, and we ask them to accept this collective apology. So long as there is not nearly enough paper to go round, letters (and articles, too) must be fewer and briefer.

Prof. D. Keilin, F.R.S. (Quick Professor of Biology in the University of Cambridge), and Sir Henry H. Dale, P.R.S. (retiring Director of the National Institute for Medical Research) have been appointed members of the Medical Research Council in succession to Prof. L. J. Witts, F.R.C.P., and Prof. C. R. Harington, F.R.S., who retired in rotation on Sept. 30. Sir Charles Glen MacAndrew, M.P., has been appointed a member of the Council in succession to the Rt. Hon. James Gray Stuart, M.P.

# War Medicine Series

*The paper printed below is based on a lecture which was one of a series recently given at the British Postgraduate Medical School, Hammersmith*

## LOUSE-BORNE TYPHUS FEVER

BY

**Sir J. W. D. MEGAW, M.B., D.Sc., I.M.S.(ret.)**

When the names "typhus" and "typhus fever" are used without qualification in this article they refer to louse-borne typhus, which is the chief member of a family called "the typhus group of fevers." The other typhus fevers are closely related to the louse-borne disease in being caused by rickettsial bodies, in having the same type of clinical features, and in producing similar pathological changes in the body. They differ sharply in being primarily diseases of lower animals; their viruses are transmitted to man as a secondary incident through fleas, ticks, or mites which are parasites of the infected animals. Because of this essential difference these fevers cannot give rise to epidemics such as readily occur in louse-borne typhus, which is directly transmitted from man to man by a human parasite, the louse. The non-epidemic, or "zootic," typhus fevers are of minor importance as war diseases, but they sometimes cause trouble by being mistaken for the human louse-borne disease, from which they may be indistinguishable by the methods of diagnosis available to isolated medical men.

Louse-borne typhus has a number of synonyms, including typhus fever, epidemic typhus, exanthematic typhus, louse typhus, historic typhus, and classical typhus. It should be noted that when German writers use the name "typhus" without special qualification they refer to typhus abdominalis, or typhoid fever; so also they use the names "pseudo-typhus" and "paratyphus" with reference to typhoid.

*Definition.*—Louse-borne typhus is a disease caused by *Rickettsia prowazeki*, which is conveyed from man to man by human lice. In most of the cases there is high fever lasting from 10 to 16 days, with early and pronounced nervous symptoms and a characteristic rash. The disease often occurs in epidemics, but it may be endemic or sporadic. Mild attacks which do not conform to the classical type are so frequent and also so important that a detailed definition based on the "typical" form of the disease would be misleading rather than helpful.

### History and Distribution

*History.*—About a hundred years ago typhoid fever and relapsing fever were first recognized as distinct diseases; previously, "typhus fever" or one of the scores of synonymous names served as a designation for any severe epidemic fever other than those that could be recognized by their special characteristics. Since the middle of the fourteenth century there have been many accounts of epidemics of fevers of these kinds in Europe, occurring chiefly in times of war or famine. In some of these accounts typhus can be recognized; others paint a confused picture made up of a mixture of typhus and relapsing fever or of typhus and typhoid. Since 1844 typhus has been recognized as a clear-cut entity, so that Murchison's description in 1862 of epidemics of the disease can hardly be improved on at the present time. The contagious nature of typhus was widely accepted, but vague ideas prevailed about the cause of the disease: for example, Murchison held that a poison was generated spontaneously in the body as a result of overcrowding and bad ventilation. In 1909 C. Nicolle produced the disease in a chimpanzee by inoculating the blood of an infected person; he also transmitted the infection from this animal to other monkeys by lice. The causal organisms were rather vaguely described by Ricketts and Wilder in 1910; Prowazek studied them closely; and in 1916 Da Rocha Lima described them accurately and called them *Rickettsia prowazeki*. The first agglutination test was carried out by Wilson in 1910: he found that the serum of infected persons agglutinated certain bacteria of the coli group which he had isolated from typhus patients, but he pointed out that the serum response did not prove that the organisms were the cause of the disease. In 1916 Weil and Felix, using a different bacillus, *Proteus* X 19, described the reaction which goes by their names. Recent work has been concerned chiefly with the prevention of the disease, especially by protective inoculation.

*Distribution.*—The disease is cosmopolitan; it is apt to break out in louse-infested communities in many parts of the world in which cool weather conditions prevail at some season of the year. In tropical countries, for some unexplained reason, typhus is decidedly uncommon except at high altitudes. On the whole it is a cold-weather disease, and although epidemics may occur in hot weather it would appear that cold or cool weather is a necessary preliminary to the widespread transmission of infection. More cases occur in the later part of the cold season and the early hot season than at other times, but there have been many exceptions to this rule. Some countries have remained remarkably free from the disease in spite of the conditions being apparently suitable for the spread of infection; for example, no great epidemics have been reported from India, even from crowded louse-infested communities in which great epidemics of relapsing fever occur at intervals. In the countries of Western Europe, in Canada, and in the United States of America the disease is now rare in times of peace; evidently the reduction in the degree of louse infestation of these countries has brought about conditions in which transmission does not readily occur. Epidemics have been reported in recent years from Poland, Russia, Ukraine, Rumania, French North Africa, South Africa, Korea, Manchuria, North China, and Asia Minor. Cases have also occurred in Mexico, Bolivia, Peru, and the high altitudes of Colombia. Official reports for May and June, 1942, show that severe and widespread epidemics were then raging in Algeria, Tunisia, and French Morocco, and that outbreaks were occurring in many localities in Spain, Hungary, Rumania, and Bulgaria; cases were also reported from Shanghai, Iraq, Iran, Turkey, and Lyons in France. No official reports are now available from Russia or countries in German occupation, but there is plenty of evidence that the disease is causing great anxiety even in Germany itself, where, in spite of elaborate precautions, many groups of cases have occurred among the soldiers engaged in guarding prisoners of war. In one instance 23 of 25 persons employed at a camp near Berlin were attacked.

In the eastern countries of Europe there is a return to the conditions which caused devastating epidemics during and after the war of 1914-18. These conditions were the existence of infection, great movements of population, malnutrition, overcrowding, lack of facilities for personal cleanliness, and louse infestation. In these circumstances typhus fever must be imposing a severe strain on the German and Russian efforts to keep it under control.

In this country the disease still smoulders in some places, and so long as louse infestation is allowed to persist there is need for constant vigilance by the medical profession and the public health services. Persons of all ages and of both sexes are equally susceptible, but attacks in young children are usually mild and so are often missed. So also in endemic areas, adults who have had previous attacks are likely to get the disease in a mild form, and thus infection may persist without being detected.

### The Virus

The rickettsiae of the disease have been isolated from the blood of patients during the febrile stage, also in some cases during the last two or three days of the incubation period; the virus usually disappears with or just before the fall in the temperature, but occasionally persists for a day or two in early convalescence. Infection is conveyed from man to man by human lice, chiefly, if not entirely, by the body louse. The louse cannot transmit infection till 5 to 10 days after biting an infected person; it then remains infective for the rest of its life. The rickettsiae are scanty in the human body, but multiply exceedingly in infected lice, chiefly in the cells of the gut. They are small organisms resembling bacilli or cocci:

they stain well with Giemsa's reagent and are Gram-negative. They do not grow in ordinary culture media, but only in the presence of living cells: for example, in tissue cultures or in the yolk sacs of developing chick embryos. In the latter they multiply rapidly, so that suspensions of the yolk sacs may be heavily loaded with rickettsiae a few days after inoculation. Monkeys are susceptible to infection: the virus can be maintained in guinea-pigs for an indefinite number of transfers by intraperitoneal inoculation, but the disease is seldom fatal to the animals and seldom causes scrotal swelling such as results from inoculation with the rickettsiae of flea-borne typhus. White mice are susceptible to inoculation by the tracheal route; the animals get severe pneumonia, and enormous numbers of rickettsiae are found in the consolidated lungs.

The virus is normally transmitted through the skin from infected lice. The exact mechanism of transmission is doubtful; some workers believe that the organisms are not introduced into the body in the act of biting, but rather by the entry of infected faeces or of fluids from the crushed bodies of the insects through the site of the puncture or through scratches. The faeces of infected lice contain enormous numbers of rickettsiae, which can survive for a long time in the dried faeces. It is therefore possible that infection may occasionally be conveyed through contact with the faeces or through the inhalation of dust particles resulting from the drying of the faeces. Some German workers have recently recorded cases in which they held that transmission by the lice themselves could be excluded. These observers emphasize the need for disinfection of the skin and clothing of the patients rather than mere disinfestation by methods which fail to kill the rickettsiae. Another matter of importance to medical attendants is that the blood of the patient is infective, so that if accidentally smeared on the fingers when making blood films it may cause infection. A case has recently been recorded in which the disease was caused by the transfusion of blood from a donor who happened to be in the incubation period of the disease three days before the onset of his attack.

*Immunity.*—An attack confers immunity, which is complete for a considerable time but gradually wears off, so that a second attack may occur; this is usually much milder than the original illness. Mild or unapparent attacks in persons with partial immunity are believed to be important sources of infection in endemic areas.

*Pathology.*—The characteristic lesions are tiny nodules in the walls of small blood vessels, especially of the brain, skin, and kidneys: the nodules are made up chiefly of large and small mononuclear leucocytes and of partly necrosed endothelial cells of the blood vessels. Necrosis of the vessel walls at the sites of the nodules is the chief cause of haemorrhages and petechial eruptions. The nodules also cause interference with the blood supply of the brain, heart, and other organs, and so are probably responsible for many of the chief features of the disease.

## Clinical Features

Most of the cases seen in severe epidemics conform to a fairly uniform type, though there are wide variations in severity. Sporadic attacks and cases in endemic areas, especially when they occur in children, are often so mild that they are very likely to be missed by medical men whose mental picture of typhus is based on descriptions of "typical" cases. The figures given in parentheses in the following account are based on reports of epidemics; they are not applicable to mild outbreaks. For a detailed account of the symptomatology the textbooks must be consulted.

*Incubation Period.*—This is usually 8 to 12 days; the extreme ranges are 5 to 23 days. As a rule the longer the incubation period the milder is the attack.

### Signs and Symptoms

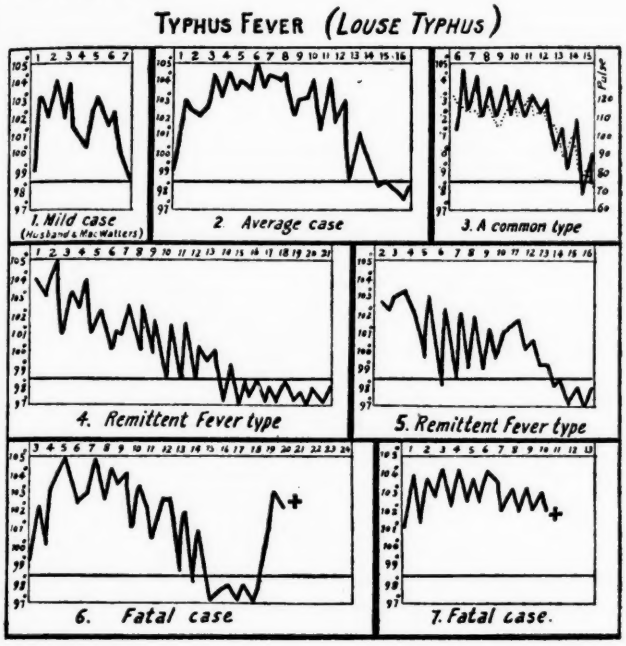
The chief features of cases seen in adults during severe epidemics are: The onset is usually sudden or rapid, with chill, shivering, or rigor (60 to 80%), severe frontal headache (90%), and pains in the back and limbs. Vomiting frequently occurs (25 to 50%). There is often suffusion of the face with swelling of the eyelids and injection of the conjunctivae. At first drowsiness or mental confusion is present, succeeded by stupor or delirium in many of the severe cases. Insomnia is frequent (50%). The temperature rises rapidly, reaching its maximum of 103° to 105° F. within two or three days and then remaining high, with daily remissions of 1 to 3 degrees for 8 to 12 days. Occasionally the temperature falls to normal for a few hours before the end of the first week; but, apart from this pseudo-crisis, the fever runs an uninterrupted course in most cases. The throat is often red (30 to 75%), the tongue and mucous membranes of the upper air passages are usually dry, and the latter may be distressingly irritated. Bronchitis is frequent (80 to 90%). Meningism is not uncommon. The spleen is sometimes palpable.

The rash is often the first diagnostic feature; in some outbreaks it has been reported as being absent in about 10% of the cases. In pigmented skins it can only be detected when it is pronounced. It appears suddenly, as a rule between the third and fifth days; in rare cases it is seen on the second day, and it may be delayed till the eighth or ninth day. Often it is preceded by a faint mottling of the skin, then pink or bluish-red macules appear on the sides of the chest, back, and shoulders, rapidly extending to the rest of the trunk and often to the arms and legs. The spots are seldom raised; at first they disappear on pressure, but soon cease to do so; at the same time their colour changes to deep red and then to brown. In severe cases there is often a petechial haemorrhagic point at the centre of each spot; this is surrounded by a brownish mottling. After a few days the spots begin to fade, but brown staining may persist for some days or even weeks. The spots may be few and difficult to detect; usually they are numerous, and in severe cases they may be very profuse. Exceptionally, the eruption is maculo-papular or papular; in severe cases it may consist of purpuric patches of varying size. The distribution of the rash is important in diagnosis. The trunk, especially the sides of the chest or back, is the favourite site; there is extension to the arms and legs in about three-fourths of the cases, but the face is affected in only a few patients (about 4%). The palms and soles are very rarely involved (about 2%). In some recent outbreaks extension to the face, palms, and soles has been relatively frequent.

The pulse soon becomes feeble, it may be slow in proportion to the temperature; the blood pressure falls, so that systolic readings of 80 to 100 are usual. Occasionally there is leucopenia, but a moderate degree of leucocytosis is usual; very high counts of 20,000 or more occur only in very severe cases. The blood tends to become concentrated; the haemoglobin readings and red blood cell counts may be abnormally high even when blood destruction is progressing. Febrile albuminuria is usual; true nephritis is infrequent, but has been reported as fairly common in some epidemics. Red blood cells in varying numbers are found in the centrifugalized urine; in severe cases there may be obvious haematuria. The leucocytes of the cerebrospinal fluid are slightly increased in mild cases—considerably so in severe attacks, in which a good deal of albumin may also be present.

The most striking feature of the disease is the rapidly progressing deterioration in the mental and physical condition; before the end of the first week the patient is often in the "typhoid state," with great prostration, low muttering delirium or coma, tremor of the tongue and tendons, and absence of response to external stimuli. Active noisy delirium and great restlessness may occur: in this condition there is an added strain to the already enfeebled heart. The breathing is usually hurried even when pneumonia does not occur; the heart sounds are feeble, especially the first sound, which may be inaudible. Even in relatively mild attacks mental disturbance and physical weakness are conspicuous features; their early onset and rapid progress are in contrast to what happens in typhoid fever. Meteorism is unusual in typhus patients. In recovering patients improvement usually sets in rapidly or suddenly; the temperature falls by rapid lysis or by crisis about the twelfth to the sixteenth day and at the same time the mental condition improves and the appetite returns. At this stage special care is needed because the patient feels so much better that he is tempted to take liberties while his heart is still very feeble. In some cases the mental condition does not clear up till some days or even weeks after the fall of the temperature: slow cerebration, deafness, and tremors of the muscles are the chief symptoms in such cases.

Most of the deaths occur between the tenth and the seventeenth day; it has been stated that the eleventh day is especially critical, but in some epidemics more patients have died after than before the fall in the temperature. A few of the types of temperature curve that may occur are shown in the accompanying chart.




*Mild Attacks.*—These are far more common than would be gathered from descriptions of the disease that are based on experience of severe epidemics: in many outbreaks severe attacks are quite exceptional. Cases in children and sporadic attacks are often so mild that they are not recognized. In surveys of suspected areas ambulatory cases or even unapparent attacks are sometimes discovered by the Weil-Felix test. The mildest cases that are likely to be recognized in ordinary conditions are those resembling an attack of influenza: the patient has fever, with pains in the back and joints, redness of the throat, headache, and lassitude. There may or may not be a rash. The fever lasts a week to 10 days, the rise and fall in the temperature are often gradual, and apart from a positive Weil-Felix reaction no reliable diagnostic indication may be present. In some outbreaks the cases are more characteristic; they have a general resemblance to the severe attacks seen in epidemics, but the signs and symptoms are all of a milder type, the temperature does not rise so high, and the fever lasts from 10 to 13 days. Complications are rare and convalescence is rapid. Even in groups of cases in which moderately severe attacks occur, the case-fatality rate may be negligible except in elderly patients. In the absence of overcrowding, malnutrition, and very heavy louse infestation the average severity of the disease is by no means great. Brill's disease appears to be a mild form of louse-borne typhus. Although this disease was first described by Brill of New York as long ago as 1897 its true nature has only recently been discovered. Zinsser has shown that the virus is of the same type as that of louse-borne typhus and that more than 95% of the patients had originally come from places in Europe in which typhus fever was endemic. This suggests that the disease may be a late recrudescence of infection which has lain dormant for years in the patients. Although 500 cases have been reported from New York since 1910 there is no record of infection having been transmitted to contacts. Cases of the same kind must occur in other countries, including, in all probability, the United Kingdom. Clinically the disease is mild typhus fever, but it can occur in the absence of louse infestation.

*Fulminating Attacks.*—At the other end of the scale are the virulent and rapidly fatal attacks. These occur in severe epidemics and usually in elderly persons debilitated by malnutrition. The patient may die within 3 or 4 days of the onset—sometimes before the rash has time to appear, but more often after the precocious appearance of a haemorrhagic eruption. Clinically the attack resembles one of haemorrhagic small-pox.

*Complications.*—The most important complication is bronchopneumonia, which occurs in 10 to 20% of cases in epidemics and is often the apparent cause of death. Thrombosis of the femoral vein is not uncommon. Arterial thrombosis occurs in 1 to 5% of cases; it may cause loss of the toes or even of one or both feet. Secondary streptococcal infections are fairly common; otitis media has been reported in as many as 10% of cases in severe epidemics, parotitis in 2 to 4%, occasionally with suppuration of the gland. Bed-sores are frequent in severe cases, especially when nursing arrangements are defective.

*Sequelae.*—In mild cases convalescence is rapid and there are no sequelae, but after severe attacks the patient slowly regains strength and mental alertness. Weakness, slowing of the mental process, tremors of the hands, and partial deafness may persist for some days or weeks. True relapses are practically unknown, but sometimes there is an irregular rise of temperature for some days after the crisis.

## Prognosis

The case-fatality rate varies greatly with age; it is almost negligible in children and is seldom more than 5% below the age of 20. It rises slowly till about the age of 40, when it is from 10 to 15%. It then rises somewhat steeply, reaching about 50% at the age of 50. Few patients of 60 and over recover. These figures refer to severe epidemics, but the risk to life always depends largely on the age of the patient. Persons debilitated by starvation bear the disease badly, and the virulence of the infection is a most important factor. Deaths are far more numerous in severe epidemics occurring in half-starved and crowded communities composed chiefly of adults: in such conditions the death rate may be as high as 40 or even 50%. In outbreaks in endemic areas the average rate may be as low as 5 to 10% if all the mild cases are taken into account. Unfavourable features in individual cases are early onset of delirium or coma, haemorrhagic rash or other haemorrhages, leucocytosis in excess of 20,000, bronchopneumonia, and thrombosis of the large veins.

*(The concluding part will appear in our next issue.)*

## POST-WAR HOSPITAL SERVICES

By arrangement with the Minister of Health the Nuffield Provincial Hospitals Trust has appointed Prof. J. A. Ryle and Dr. A. E. Quine to carry out a survey of hospital services in the North-East of England (Northumberland, Durham, and Cleveland). This will be conducted on the same lines as the surveys now being carried out by officers appointed by the Minister of Health in the London area and in the North-West. This is part of an arrangement under which the Nuffield Trust, with the concurrence of the County Councils Association, the Association of Municipal Corporations, and the British Hospitals Association, has agreed to assist the Ministry by organizing surveys of hospital services in various parts of the country. The areas to be surveyed and the officers to be appointed will be agreed between the Minister and the Trust. The object is to obtain expert advice on the hospital resources and needs of the areas so as to provide a factual basis on which the Government's post-war hospital policy, which was announced by the Minister of Health in the House of Commons on Oct. 9, 1941, can be worked out. The policy, briefly, is to place a duty on the major local authorities, in collaboration with voluntary bodies, to provide a service which will ensure that "appropriate treatment will be readily available to every person in need of it."

Prof. J. C. Drummond, D.Sc., Scientific Adviser to the Ministry of Food, will deliver the Harben Lectures for 1942 on "Problems of Wartime Nutrition" at the Royal Institute of Public Health and Hygiene, 28, Portland Place, W., on Mon., Tues., and Wed., Oct. 26, 27, and 28, at 3 p.m. In his first lecture he will discuss "The Background to the Study of Nutrition in Wartime"; in the second "Deficiency Conditions to be guarded against in Wartime"; and in the third "Measures taken to maintain a Good Nutritional Condition of the People in Wartime." Admission to the lectures is free, and seats may be reserved on application to the acting secretary of the institute.

## WOMAN-POWER AND MATERNITY

The Minister of Health, who presided over the National Conference on Maternity and Child Welfare which was held recently at the B.M.A. House, London, said that the confinements which have taken place in the emergency maternity homes set up under the evacuation scheme number 57,000, and additional homes are kept in reserve in case of need. Only normal cases are attended in these homes, but each home is linked with a hospital for abnormal cases, and the service of obstetric specialists is available if required. At more than 60 hostels women may spend a period before entering a maternity home and again after leaving it. The Minister appealed for women to take up midwifery or to return to it if already qualified. Although there are 65,000 registered midwives, only 15,000 notified their intention to practise last year. In the later proceedings of the Conference the question of the pregnant woman in industry loomed large. There appeared to be general agreement that the armed Forces are not the place for expectant mothers or for mothers with very small children. It is the rule that expectant mothers must leave the Services as soon as possible after the third month of pregnancy. If their record has been satisfactory their certificate is endorsed "suitable for re-enrolment," but no woman is actually enrolled or re-enrolled until 6 months after confinement, and even then it is thought better, if she must be employed, that she should take a civil job rather than re-enter one of the Services.

The question of the pregnant woman in industry is much less easy of solution. Several of those who addressed the Conference spoke of the difficulty of inducing the pregnant woman to report her pregnancy. She is apt to think that there is no reason why her work at the factory should be suspended during the early part of the period, and, of course, the factory doctor cannot inform the management of a woman's pregnancy without her consent. It is also true that most ordinary factory jobs can be done by women in the early stages of pregnancy, but if the work involves the handling of lead or mercury, with the risk of industrial poisoning, or requires the woman to carry heavy weights or to climb heights, pregnancy even in the early stages should be a bar. Pregnant women also should not be allowed on night shifts. Otherwise the length of time the pregnant woman remains at work depends upon her economic conditions and the amount of consideration she is fortunate enough to receive. Dr. Margaret White, who addressed the Conference on this subject, said that in her experience most women worked up to the end of the seventh month. It is worth recalling what Germany and Japan did in this respect, at all events before the war. In Germany no employer was allowed to dismiss a woman 6 weeks before or 6 weeks after her confinement. Time off for breast-feeding and rooms for nursing mothers were provided. The law also ordained less tiring work to be given to pregnant women. In Japan employers were not allowed to let women continue at work for 4 weeks before or 6 weeks after their confinement, and for the time lost a woman received up to 60% of her wages. In this country there is no legislation safeguarding the pregnant woman, probably because female industrial labour has not been so common here as in some other countries. Dr. Letitia Fairfield told the Conference that in her experience the gynaecological disabilities encountered among women in the Services were not nearly so many as were supposed. Any major troubles—fortunately rare—were dealt with at Service or E.M.S. hospitals under specialists, while minor disabilities such as dysmenorrhoea or menopausal conditions were treated either by medical officers in the Service (of whom in the R.A.M.C. and the R.A.F. Medical Service a considerable number are women) or by selected specialists at the hospitals. Women's Services, Dr. Fairfield thought, were well cared for in these respects, but in organizing arrangements for her own Service she had been impressed by the need for better provision for dealing with minor gynaecological conditions among civilian women.

## RECENT NUTRITION STUDIES

The report of the Governing Body of the Lister Institute for 1942 is a brief survey of the scientific work done during the year. Special interest attaches to the work of the Division of Nutrition, which is located at Cambridge. Here Dr. Harriette Chick and others have been investigating the biological value of the proteins contained in wheat flours, more especially in national wheatmeal (85%), which is milled to contain as much as possible of the aleurone layer and embryo (or germ) of the grain, and as little as possible of the bran. The biological value of the mixture of proteins in national wheatmeal (as judged by experiments on young rats, taking the weight increase per gramme of protein ingested) was found to be about 15% higher, and that of the proteins in wholemeal (100%) about 20% higher, than that of the proteins of white flour (73 to 75%). The digestibility of the protein in the three types of flour was found to be rather lower in national wheatmeal and in wholemeal, but this is more than compensated for by the higher biological value of their proteins.

Some work has also been done on $B_2$ vitamins in different types of flour. The highest concentration of riboflavin was found in the germ; that of "middlings" and bran was intermediate; and that of white flour (endosperm) lowest. The contents in white, national wheatmeal, and wholemeal flours were in the order of 1 : 3 : 4. The amount of riboflavin present in wholemeal and national wheatmeal is only about one-half or one-quarter that present in such foods as meat, milk, and eggs, but breads made from these flours may provide an important source of this vitamin, owing to the relatively large amount of bread that is eaten. In its content of B vitamins, as in the biological value of its proteins, national wheatmeal has been found intermediate between wholemeal and white flours, though nearer to the former.

An interesting experiment has been made with dried yeast as a supplement to milk in a rural school community. The dried yeast was prepared from cultivated *Torula utilis* and was well tolerated, digestive disturbances being reported in only three cases. During ten weeks 79 children received, with the school milk, a biscuit daily for five days containing 10 grammes of the cultivated dried yeast, and an equal number received a similar biscuit containing no yeast. The children who received the yeast showed an average weight increase of 1.7 lb., while the control group showed only 1.2 lb. A smaller number of children completed a five-months trial during which the increase in weight of those who received the yeast biscuit was 4.4 lb., while those in the control group showed an average increase of only 3.1 lb.

The influence of intermittent consumption of vitamin C on the development of scurvy has also been studied, and on the basis of experiments on guinea-pigs the conclusion is drawn that in the case of a man a quantity of the order of 100 mg. of ascorbic acid consumed at intervals of several days or even weeks would offer protection against scurvy. This consideration has a bearing on the consumption of vitamin C during winter and early spring, when the urban population has largely to depend on the potato for a continuous but moderate supply of vitamin C. The additional occasional intake of high quantities of ascorbic acid present in those vegetables and fruit which are rich in it acts, in all probability, as a safeguard if and when the consumption of vitamin C through the medium of the potato is not quite adequate.

In addition to these nutrition studies the workers under the auspices of the Institute have been engaged in various serological, biochemical, and endocrinological investigations. Two only can be mentioned here. The technique of typing paratyphoid B bacilli with the Vi bacteriophage has been developed and is being successfully applied in the epidemiological investigation of outbreaks of the disease. In the endocrinological field the effects of male and female sex hormones and their co-operative activity with thyroid and adrenal cortical hormones have been studied, and a study has also been made on the effect of ageing on the weights of endocrine and certain other vital organs.

# Reports of Societies

## DEFICIENCY DISEASES

The third scientific meeting of the Scottish Group of the Nutrition Society was held at Gleneagles, Perthshire, on August 26, when papers were read on the signs and symptoms of deficiency diseases.

### Vitamin B

Prof. V. P. Sydenstricker (U.S.A.), describing the clinical patterns associated with deficiency of the B group of vitamins, pointed out that the requirements for certain of the B group of vitamins depended on the composition of the diet, and that synergistic reactions probably further conditioned the requirements. Vague malaise, weakness, lassitude, nervous irritability, mild depression, muscle pains, anorexia, and consciousness of disturbed gastro-intestinal motility were early symptoms in all group B deficiencies. Later, physical signs developed into fairly definite patterns. All symptoms and signs resulting from dysfunction or degenerative changes of the peripheral nerves and heart were attributed to thiamine deficiency. Certain dermatoses and lesions of the mucous membranes and symptoms referable to the cerebral cortex and mid-brain were thought to depend on depletion of nicotinic acid. Other changes in the skin and mucosae and a variety of disorders of the visual apparatus responded to treatment with riboflavin. In addition to these there were certain dermatoses and ocular disturbances which responded only to treatment with the entire B group. The lecture was illustrated by an excellent collection of coloured lantern slides.

Dr. John Yudkin (Cambridge) reviewed the diagnostic criteria of vitamin deficiency in relation to recognized diseases of unknown aetiology and obscure signs and symptoms. He pointed out that the available tests could be divided into those which demonstrated the existence of deficiency and those which showed that deficiency was the cause of the condition. There were four stages in diagnosis: (*a*) indirect evidence of deficiency, (*b*) direct evidence of deficiency, (*c*) the presence of signs to be expected in deficiency, and (*d*) the cure of the condition by correction of the deficiency.

### Vitamin A

Dr. J. R. Mutch (Aberdeen) observed that, although vitamin A appeared to be related to the regeneration of the visual purple, neither the extent nor the rate of dark-adaptation, in his studies, bore any close relation to the vitamin A content of the diet. Since the introduction of wartime restrictions on diet there had been no increase in the amount of night blindness, while chronic blepharo-conjunctivitis and corneal ulceration had decreased in frequency. On the other hand, more infants had shown severe photophobia, which readily cleared up on improvement of feeding and treatment with cod-liver oil and ultra-violet light. Mr. J. Gerrie (Aberdeen) described the value of vitamin A in the treatment of nasal sinusitis of children, a condition which seemed to be increasing at present. The older treatment of weekly antral lavage was unsatisfactory, for in 60% of the cases suppuration recurred after the condition had apparently cleared up. Vitamin A given to cases with suppuration did not seem to influence the infective process, but appeared to be effective in the pre-suppurative stage. A number of non-suppurative cases in which the typical thickening of the antral lining had been confirmed by *x*-ray examination were given vitamin A by mouth or by intramuscular injection, and after one to six months, only about 20% showed suppuration, while 80% of a group of similar control cases treated without vitamin went on to suppuration.

### Vitamin D

Prof. Noah Morris (Glasgow), discussing vitamin D deficiency, said that the classical type of rickets with its marked skeletal deformities had almost entirely disappeared in this country, but had left in its place a form of disease which was possibly more dangerous because it was not obvious. Formerly, the earliest manifestations of rickets were thought to appear about the fifth month, but now it was known that rickets might occur in the foetus if the mother was suffering from calcium and vitamin D starvation. He pointed out that while osteomalacia was most commonly associated with pregnancy and lactation, it might also be produced where there was insufficient intake or poor absorption of lime. The non-pregnancy type might often involve the spine alone and was apt to be diagnosed as rheumatism. Tetany might occur, and there was often weakness and stiffness, especially in the adductor muscles of the thighs.

### Other Deficiencies

Dr. A. Lyall (Aberdeen), in a paper on calcium and phosphorus deficiency and hypoproteinaemia, pointed out that primary nutritional disturbances of these types were rare. Nutritional hypoproteinaemia was infrequent, but might be associated with anorexia or pregnancy and sometimes with imbalance of chloride and fluid. Prof. L. S. P. Davidson (Edinburgh) reported an investigation he had carried out in Edinburgh on the haemoglobin values in infants, children, and pregnant women, and compared the results with those found in a similar investigation in Aberdeen a few years ago. Prof. H. Dryerre (Edinburgh) gave an interesting lecture on deficiency diseases encountered in veterinary practice.

# Correspondence

### The Purpuric Type of Cerebrospinal Fever

Sir,—I was most interested to read Dr. I. S. Fox's medical memorandum on fulminating purpura and adrenal haemorrhage (Aug. 22, p. 218), and in particular his comment, in which he states that the accepted view appears to be that these cases "are due to a massive bacteriaemia, and Maclagan and Cooke (1916) suggest a selective action by the meningococcus."

In the *Journal* in June, 1907, I described fulminating cases of cerebrospinal fever with purpura, and the purpura in one case was so extensive that the portion of the body covered with large purpuric blotches was greater than the rest of the body. In this case there was practically no neck rigidity and Kernig's sign was absent. The meningococcus was recovered from the spinal fluid and the patient (a child) died in 22 hours from the onset. This case was seen by me at Purdysburn Fever Hospital, Belfast, where I saw about 350 cases of the disease (1906-8). Purpuric rashes were more common in the earlier stages of the epidemic, being present in 24 of the first 75 cases seen by me.

That there *is* a purpuric type of the disease I have no doubt; and in an article in the *Practitioner* for June, 1915, this type of the disease was mentioned and described by me; in this article one of my conclusions regarding cerebrospinal fever was that acute toxaemia may be caused by meningococci, and that patients suffering from acute toxaemia during an epidemic of cerebrospinal fever should be bacteriologically examined to see if meningococci were present.

At the post-mortem examination of purpuric cases in the epidemic, in addition to the skin condition, haemorrhages were observed on the peritoneal surfaces of the intestines, bladder, kidneys (including the suprarenals), on the heart, and occasionally the pleura. In the abdomen mesenteric glands were very frequently found enlarged and inflamed and the Peyer's patches and solitary follicles affected. In no cases seen post mortem were signs of disease found in the brain and meninges without intestinal involvement being noted, though intestinal signs were observed without any indication of disease in the brain and meninges. These findings, along with the fact that toxaemic cases without cerebrospinal fever had been observed, prompted the suggestion that the title "cerebrospinal" applied to the disease was misleading, and they also suggested the possibility of the intestinal tract being one of the portals of entry of the meningococcus, for in post-mortem examination of some fulminating cases no meningeal signs were evident.

Readers are referred to the articles mentioned. That in the *Practitioner* contains detailed observations regarding several hundred cases of cerebrospinal fever and a note on what I

believe was the first case of cerebrospinal fever to receive treatment by Flexner's serum on this side of the Atlantic. I have still in my possession one of the original vials of this serum, unopened, taken from Flexner's original and famous horse.—I am, etc.,

Glossop. ERNEST H. M. MILLIGAN.

### Lister Technique for Emergency Surgery

SIR,—I agree with Prof. R. J. Willan (Sept. 5, p. 291) that the revival of the Lister technique would be good for emergency operations, but I would add—for all accidents. There seems to be something wrong with the technique of aseptic surgery, judging by some articles in the *Journal* recently on hospital infection of operation wounds. My experience of the Lister technique dates back to the 80's of last century when I was a student under, and afterwards H.S. to, the late Sir Hector C. Cameron, Lister's assistant when the latter was experimenting with antiseptics. During that time I never saw an operation wound suppurate, and we had no stitch abscesses, which seem to be quite common to-day. Accidents did better than they do now. I remember three cases in particular: a compound comminuted fracture of both bones of the forearm with a wound opening into the carpo-metacarpal joint of the thumb; a compound dislocation at the knee with the trochanter protruding through the skin and covered with mud and horse-dung; and a scalp wound extending from behind one ear, over the vertex to behind the other. All these healed without any suppuration.

One of the most important things in Lister's technique, according to a French surgeon, was his "extreme and minute care in dressing wounds." In this my chief copied Lister; for those wounds he did not dress himself he allowed no one but his H.S. to dress. In another hospital where I was H.S. the technique was supposed to be "antiseptic," but the regular routine was for one nurse to go in front of the surgeon to undo the dressings and another to do them up afterwards. Needless to say that nearly every wound suppurated.

Recently, as examiner for an accident insurance company, I have been astonished at the number of septic wounds I have seen. Perhaps the present-day teaching that antiseptics "soil" wounds has something to do with it. When I told a young lady doctor recently how Lister used to pour crude carbolic acid into compound fractures, she exclaimed: "That would cause gangrene; we were taught never to use carbolic acid because it would cause gangrene." Here is a conundrum. Lister saved his patients by using carbolic acid seventy years ago, and to-day it causes gangrene. Why? The crude carbolic was probably about 5% of pure phenol.—I am, etc.,

Birmingham ROBERT ANDERSON.

### Group Psychotherapy

SIR,—The most striking feature of Dr. Maxwell Jones's interesting article (Sept. 5, p. 276) is its emphasis upon the low morale so blatantly displayed by present-day "neurotics." During the last war mental conflict was mainly between repressed self-preservation urges and the conscious ideals of courage and "doing-one's-bit" creditably. In the interval between the two wars the process of debunking has been carried to such a pitch that a large section of democracy has come to regard the idea of self-sacrifice as ridiculous if not hypocritical. A reversal thus apparently has taken place, and it is now the moral and herd instinct tendencies which are repressed, while the conscious self-centred urges are shamelessly acclaimed. Conversation with shopkeepers and managers of multiple stores has revealed to me, in a way direct contact failed to do, the prevalent ignorance as to what is involved in this war. I gathered from the above sources of information that any difficulty in getting wished-for commodities is frequently met by their clients with the remark, "We should be as well off under Hitler." No wonder that so many seek to "dodge the column." The group of patients reported upon by Dr. Maxwell Jones is peculiarized neither by having "a very circumscribed outlook" nor by being largely preoccupied with its domestic situation, but rather by having a vegetative lability which can be used as a means of escape from responsibility. Even so, these patients are at no pains to hide from themselves or others their dislike for serving their country. In such an atmosphere psychotherapy is indeed "conducted under rather difficult conditions." Dr. Maxwell Jones's triumph is to have realized that what these so-called neurotics need is education. Both the methods he suggests are admirable, but should not be confined to E.M.S. neurosis centres or special clinics.

The question, however, arises as to how far the medical profession is justified in a deliberate attempt to inculcate moral principles. The question might be asked in the House. The psychotherapist in the last war felt himself on safe ground when showing a "shell-shock soldier" that courage was compatible with fear and that the latter should be overcome but not repressed. In this war it has become rather embarrassing to explain to so-called neurotics that courage and self-sacrifice are anything other than avoidable foolishness. Hence the plan for group education, as set out by Dr. Maxwell Jones, is a most promising one.—I am, etc.,

Caldecote. A. E. CARVER.

### Circulatory Overloading after Rapid Intravenous Injections

SIR,—It is possible that the most interesting article on circulatory overloading following rapid intravenous injections by Drs. E. P. Sharpey-Schafer and John Wallace (Sept. 12, p. 304) may result in some clinicians belittling the dangers of too rapid infusions in patients who are not "convalescent without cardiovascular disease." The authors do not in any way suggest that the reaction of ill people, possibly actually undergoing an operation, would be similar to that of their experimental subjects; nevertheless there would seem the risk of such being inferred.

Less than two weeks before the publication of this article a patient of mine, aged 46, with a chronic lung abscess, died from pulmonary oedema 2 hours after lobectomy. The operation, which was associated with moderate blood loss, lasted approximately 2¼ hours, during which a pint of normal saline and 3½ pints of blood were given. He was in excellent condition at the end of the operation, but as soon as he was returned to bed became cyanosed, and respirations were "bubbly" as a result of the accumulation of thin, blood-stained, watery fluid in the air passages. In spite of repeated aspiration of this fluid he died 2 hours after the end of the operation. At necropsy the right side of the heart was bloated with blood and the lungs and air passages filled with great quantities of blood-stained oedema fluid.

Instead of a convalescent subject with a normal cardiovascular system we were dealing with a middle-aged man who had suffered the chronic toxic effects of a lung abscess for 12 months, and who was receiving operative trauma at the time of the infusion. Under such conditions the dangers of too rapid intravenous injections are only too real.—I am, etc.,

St. Albans. OSWALD S. TUBBS.

### Hereditary Factor in Cardiovascular Disease

SIR,—Dr. Edwin Goodall (Sept. 12, p. 322) has raised a most important point, and one urgently requiring attention, when he stresses the importance of studying the hereditary incidence of hypertensive disorders and "replacing impressions by reliable family histories on a uniform basis." The tendency has often been to place the blame for hypertension on mental or physical stress, diet, tobacco, or alcohol, and to neglect the hereditary aspect of this condition.

Weitz, in a most interesting address before the Deutsche Gesellschaft für Kreislaufforschung at Bad Nauheim in 1936,[1] described in great detail his investigations over a lengthy period into the histories of patients suffering from hypertensive disorders—not only their pedigrees, but the details of their personal lives which might be considered likely to influence their blood pressures. His conclusion was that, apart from dietary influences in certain cases, the main causal element was that of heredity. Campbell[2] states that in 30 cases of inherited heart disease associated with arteriosclerosis, obesity, and hyperpiesia, investigated by Ryle and himself, 24 gave a history of the father or mother being also affected, while in 6 cases the parents were unaffected but the sibs of the patients suffered from the same disorder. This would appear to show that, while usually

1 *Verhandl. der Dtsch. Gesellsch. für Krieslaufforschung*, 1936, **9**, 11.
2 In Blacker's *Chances of Morbid Inheritance*, London, 1934, p. 245.

dominant, the condition may also be inherited as a recessive trait.

Allen[3] affirms that heredity is more important than all other factors in the aetiology of arteriosclerosis. He points out on the one hand the individual with healthy forebears, from the cardiovascular point of view, who in spite of severe stresses and strains reaches old age with healthy arteries, and on the other hand the young patient with advanced arteriosclerosis, perhaps associated with diabetes, in whose case the only contributory factor is a poor eugenic background.

For several years I have collected pedigrees of patients with hypertensive disorders, and find in these strong confirmatory evidence for the hereditary causation of the circulatory diseases. One such pedigree, with detailed notes on individual members, I have recently published in the *Eugenics Review*.[4]

I feel most strongly with Dr. Goodall that the whole question of the inheritance of hypertensive disorders is of such immense importance that it merits detailed investigation by as many observers as possible, both in hospitals and in private practice, and the correlation of their findings by geneticists and statisticians.—I am, etc.,

Coningsby, Lincoln. J. W. MCFEETERS.

## Failure of Splenectomy in Purpura Haemorrhagica

SIR,—I hope your readers will not be unduly influenced by the levity, probably inadvertent, with which Prof. Witts in his paper on ulcers of the leg in purpura haemorrhagica (Sept. 12, p. 309) decides on removal of the spleen. As the platelets numbered only 19,000 and 20,000 respectively, "splenectomy was advised." In one case no benefit was obtained, and in the other an excellent recovery was made. In the later case it is too early to say that this is permanent, for a period of improvement in purpura haemorrhagica is often followed by the recurrence of the disease in all its aspects notwithstanding splenectomy.

It is now some 17 years (*Lancet*, 1925, **1**, 323) since the late G. A. Sutherland and I introduced splenectomy into this island as a treatment for purpura haemorrhagica, and enough experience has been gained to state that splenectomy has a very limited role in the treatment of that condition. In my later experience splenectomy is only justified (1) in severe cases which fail to respond to dietetic and antitoxic measures designed to eradicate foci of infection, and (2) in fulminating cases where death is threatened from exsanguination by external haemorrhage. The temporary benefit seen after splenectomy would appear to be due to the removal of a depot or concentration in the spleen of the factor which has the faculty of increasing the permeability of the capillaries to the extravasation of erythrocytes which manifests itself as purpura and ecchymosis.

When splenectomy was first applied in purpura haemorrhagica it was thought that the condition was due to an essential thrombocytopenia, but further experience does not bear out this theory. Lack of circulating platelets is found in practically all conditions in which purpura is seen—e.g., the specific fevers, diphtheria, nephritis, etc. In these conditions a toxic effect on the capillary wall seems a reasonable pathological explanation, and the scantiness of the circulating platelets may be explained by the numbers immobilized in plugging the lesions in the capillaries. Where the primary condition is not recognized, an essential failure in platelet production is postulated in the term "essential thrombocytopenia," but this is no more than an expression of our ignorance, and there is no evidence whatsoever that it is a disease *sui generis*, as is implied by Prof. Witts in his introduction. Splenectomy does not remove the cause of the loss of circulating platelets except for a brief period in chronic cases. In mild cases I have had successful results by purely medical measures designed to raise the general standard of health.

The failure of splenectomy in purpura haemorrhagica is well illustrated in a post-operative history of some 17 years in all three cases in our original paper. Apart from a brief period of under two years immediately after the operation, during which clinical manifestations were scanty or absent, these patients could and can at any time be diagnosed as victims of purpura haemorrhagica (and of splenectomy). The female histories are almost identical, with menorrhagia, metrorrhagia, epistaxis, purpura, and anaemia. During this period one has undergone an emergency abdominal operation for severe ovarian haemorrhage. (This has also occurred in another case under my care splenectomized at Bradford in 1928.) In recent months the third case in our original communication has given cause for great but unfounded anxiety. She reported herself as pregnant. Despite twenty years' history of haemorrhages and purpura she went to labour and gave birth to a fine boy with a total loss of only 3 oz. of blood notwithstanding a platelet count of only 50,000 per c.mm. throughout the whole gestation. The baby was born with purpura on the tip of his nose and on the palate, and the platelet count was only 40,000 on the 14th day of life: since then no further purpura has occurred and the platelets are normal at 260,000 per c.mm.

I fear I have trespassed beyond the normal confines of a letter, but I think it is important to mitigate the mischief which might be caused when splenectomy is undertaken from a chair of medicine with no higher grounds stated than lack of platelets, a feature which the operation more often than not fails to alter in severe cases. I quite realize that Prof. Witts was experimenting in his two cases, but his reason for the operation is too baldly stated and too casual in its implication to pass unchallenged.—I am, etc.,

London, W.1. BRUCE WILLIAMSON, M.D., F.R.C.P.

[3] *Nelson's Loose-Leaf Living Medicine*, 1924, **4**, 531.
[4] *Eugen. Rev.*, 1941, **33**, 73.

## Single-handed Anaesthesia and Operation

SIR,—Dr. W. Brian Gough (Sept. 5, p. 295) has raised the question of single-handed operating and anaesthetizing. In the present state of medical public opinion it is bad policy for a doctor to attempt both. Leaving policy on one side for the moment, and regarding merely the facts, we do find that when matters are suitably arranged the patient is his own best anaesthetist, requiring only that amount of help which any person capable of watching or hearing air bubbling through ether is competent to give. That means in practice anybody provided he is not both blind and deaf. It is a well-known fact, though much neglected, that the secret of safe anaesthesia is an open airway. The procedure then for the would-be combined operator and anaesthetist is as follows: (1) get the patient under; (2) introduce a tube into the trachea and fix it and connect up with the suitable apparatus.

It would be tedious to describe this suitable apparatus, but it may be said that it has the following advantages. It is very simple. It is inexpensive (£3 13s. 6d.). It is automatic in action. It is more accurate than the most skilled anaesthetist, for the dose is exactly regulated to the operative procedure by a mechanism that has been perfected over many millions of years—namely, the patient's own respiratory centre. It can be and is generally used with oxygen from a cylinder, but is quite independent of that oxygen. This is a very important point. If the definition of the anaesthetist which afforded a source of never-failing amusement to one of the greatest of living surgeons—namely, "that person who sits at the head of the table more than half asleep while the patient on the table is more than half awake"—has any measure of truth in it, and it has some, then the said anaesthetist may not notice when the oxygen cylinder of a Boyle or a McKesson has run out. In such a case the oversight, even if short-lived, might be fatal. With the apparatus in question it wouldn't matter, for the patient would still be getting as much $O_2$ as the rest of us. If oxygen from a cylinder is being used, the lungs can be flooded with oxygen in two seconds by merely turning the tap of the oxygen cylinder—a manœuvre which also stops the anaesthetic. By pinching the tube on the exhaust valve 16 times a minute oxygen pressure in the lungs can be varied as required without danger of rupturing the air vesicles. By immersing this same tube in water, pressure in a collapsed lung can be raised to any desired height. Anaesthesia with it is so simple, so safe, so automatic, that one anaesthetist provided with six watchers could quite easily superintend as many operations in a theatre arranged for that number. Ether, $CHCl_3$, gas and $O_2$, and $CO_2$ have been given by means of it.

After what I have said it might seem that here at last is the secret of immortality, but this is not so. The human heart, one of the most wonderful things in creation, wears out at last, and occasionally that moment comes when under the influence of an anaesthetic. The apparatus puts the patient in the best possible position to carry on a bit longer. It has one disadvantage—it does not anticipate the wishes of the surgeon but rapidly overtakes them.—I am, etc.,

Manchester. E. FALKNER HILL.

## Bee Stings

SIR,—Dr. R. Drummond (Sept. 19, p. 352) need not be surprised. His desperate run may have saved his life, as it is possible that violent exercise after being stung is a prophylactic against anaphylaxis.

A recent personal experience suggests this explanation. On the hottest day of August this year I was attacked by bees near an apiary on Exmoor, and directly afterwards pushed

and dragged a bicycle through dense heather for over a mile, a very sweaty job. Except for slight itching, the 10 or 12 stings on face, ears, and scalp caused no symptoms. Yet a few years ago I suffered from severe symptoms of anaphylaxis after half that number of stings, as described in a letter to the *Journal* (Aug. 26, 1939, p. 471) to which Dr. Jex-Blake refers. On this occasion I suggested non-specific sensitization as a possible cause of the reaction, as I had been given injections of immunogen for pneumonia a few weeks previously.

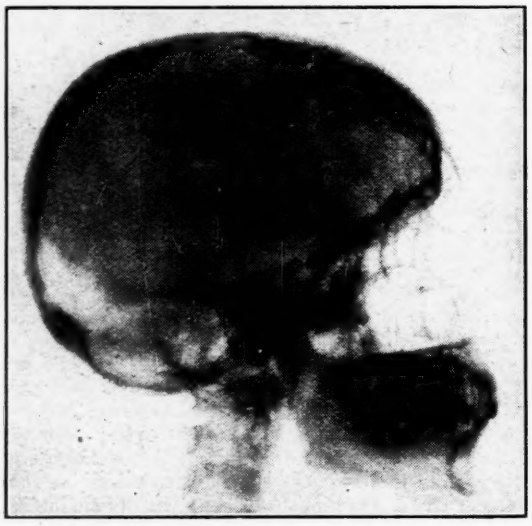
A shrewd old "beeman" once got badly stung looking through a hive of mine. I offered to drive him home, but he refused, saying that he would walk it off and that he would be better for a good sweat. Now sweating usually *accompanies* anaphylactic shock; hence is it not more likely that any good effects of exercise are due either to increased lymph flow or to the presence in the circulation, as the result of muscular activity, of a chemical substance antagonistic to bee venom? Here, perhaps, although in the reverse direction, may be an explanation of the effect of bee venom in the treatment of muscular rheumatism, an effect vaguely attributed to "protein shock."—I am, etc.,

Exeter. R. Fortescue-Foulkes.

## Hyperostosis Frontalis Interna

Sir,—Dr. C. T. Andrews's interesting publication (Aug. 15, p. 185), and the discussion which followed, prompt me to report a case recently seen by myself which presented, together with the typical radiological appearances of the disease (*vide* photograph), unusual attacks, and I should be grateful for an opinion as to the mechanism of their causation.

The patient, again a woman, 44 years of age, had a fall on the back of her head in March, 1940. Symptoms appeared for the first time three weeks later, five days after a minor gynaecological operation under a general anaesthetic. They consisted of inability to get up owing to severe disturbance of equilibrium (tendency to fall backwards) and a dragging sensation at the back of the head. After rest in bed for two weeks, when pressure and a cramp-like sensation was felt in the occipital and temporal regions of the head, attacks of tinnitus, nausea, vomiting, diarrhoea, cold perspiration, and "deadness" of hands, feet, and nose occurred, which lasted for several hours and recurred at first three times a week. With rest they became gradually less severe and less frequent. During these attacks hyperacuity of hearing and oversensitiveness to light were



noticed. Pressure in the head, giddiness, and occasional vomiting persisted until the end of 1941, and impairment of general health, muscular weakness, and ill-defined sensations in the head are still present.

Apart from a definite obesity of the girdle region and the thighs, nothing abnormal was found on clinical examination. Menstruation was regular, but lasted for two and a half days only instead of the customary four days before the present illness. Low body temperature. Blood pressure 130/80. No abnormal constituents in the urine. B.M.R., −18%. Blood-sugar tolerance curves: fasting 90 mg. %, 160 mg. % half an hour, 170 mg. % one hour, 120 mg. % one and a half hours, 80 mg. % two hours after ingestion of 50 g. of glucose. Serum calcium 12 mg. %. Haemoglobin 84%, R.B.C. 4,480,000; blood platelets 313,000; bleeding time 3 minutes; coagulation time 5 minutes; differential leucocyte count: 2% eosinophils, 57% polymorphs, 35% lymphocytes, 5% monocytes. The *x*-ray film of the skull shows hyperostotic changes in the frontal and perhaps in the parietal and sphenoidal bones. The outer table is not involved. The diploe of the entire vault appears thickened. The frontal sinuses are large and there is marked over-pneumatization of the mastoid cells.

As in most cases of hyperostosis frontalis, symptoms are not directly attributable to local pressure of the newly formed bone. The symptomatology of this disease is often so ill defined that it is usually diagnosed as hysteria. A frequent occurrence is that symptoms appear only after cranial injury (cf. Knies and Le Fever, *Ann. intern. Med.*, 1941, **14,** 1858). An interesting question which has arisen in the present case and which may apply to similar cases is whether an accident insurance is liable to pay compensation for the post-traumatic impairment of health.

Dr. J. MacKay Crawford (Aug. 29, p. 261) is right in pointing out that Dr. Andrews's case has a *lowered* glucose tolerance (the glucose tolerance *curve* being abnormally high).

As to the causation of the condition, most authors regard, contrary to Prof. Henry Cohen's view (Sept. 5, p. 292), a dyspituitarism as one of the causative factors. The reason for this is that anterior pituitary function is intimately linked with cranial architecture, so much so that cranial dysplasia can be regarded as a pathognomonic manifestation of pituitary dysfunction. Lack of pneumatization, thin external and internal tables, and sclerosed diploe are signs of primary hypo-antuitarism, while over-pneumatization, expansion, and increased vascularization of the diploe occur with primary hyperfunction of the anterior lobe (cf. Mortimer, Levene, and Rowe, *Radiology*, 1937, **29,** 135). Secondary functional deficiency of the anterior lobe manifests itself in sclerosis of the diploe either in a normal or over-pneumatized skull according to the primary state of pituitary function. Hyperostosis frontalis interna can probably be regarded as a special form of this cranial dysplasia.

Dr. Andrews has reviewed the literature and stressed the possible relation between the anterior pituitary lobe and the parathyroid glands. The cranial changes in acromegaly and pituitary dwarfism point to the significance of the eosinophil cells of the anterior pituitary lobe (growth-promoting factor) for cranial development, and Hemphill and Stengel (*J. ment. Sci.*, 1940, **86,** 341) have found an eosinophil adenoma in one case of hyperostosis frontalis interna.—I am, etc.,

London, W.1. H. Ucko.

## Sunlight Eruptions after Medication for Gonorrhoea

Sir,—Referring to the article by Capts. R. G. Park and W. M. Platts (Sept. 12, p. 308) on sunlight eruptions in patients with gonorrhoea treated with sulphonamides, the following observations are probably worth mention. In Vienna in the late 'twenties intravenous injection of acridine and its derivates had been widely used for the treatment of gonorrhoea. A considerable percentage of patients treated in that way showed photosensitivity—namely, an erythema on the parts exposed to the sun, followed by a deep dark pigmentation. Occasionally the pigmentation affected the mucous membrane of the lips. Following the recommendation of French dermatologists, resorcin tablets (0.25 gramme) were given after the injection as a preventive with good results.—I am, etc.,

Bacup. A. Fessler.

## "Constipation" in Breast-fed Babies

Sir,—Prof. Charles McNeil in his alphabet of breast-feeding (Sept. 5, p. 271) perpetuates an old error. He clearly believes that a breast-fed baby ought to have a daily bowel action. Under the heading of "constipation" he writes: "One type of constipation fairly common in breast-fed babies is of special character and seldom described in books. There is no bowel movement for two or three days, and then the passage of a large soft healthy motion. General health and digestion are excellent. The cause is anal spasm . . . the remedy is to pass the little finger covered with vaseline into the anal canal. . . ." Thus an imaginary pathology ("spasm") is invented to explain a non-existent disease ("constipation").

Large numbers of perfectly healthy breast-fed babies will only have a bowel action every two, or three, or even four days. As Prof. McNeil says, these babies thrive and their stools,

though infrequent, are soft and healthy. Why then need we suppose that there is anything the matter? Why must they conform to our adult standard of a daily action? Our duty in these cases is to allay maternal anxiety and prevent the giving of aperients. I repeat, there is nothing whatever the matter with these babies, and they should be left alone. The regular daily habit will establish itself later on.—I am, etc.,

Crowthorne, Berks. E. F. CHAPMAN.

### Nomenclature of Night Blindness

SIR,—I hope you will permit me to comment as briefly as possible on the very interesting discussion between Mr. Francis E. Preston and Dr. J. Price Williams on this subject.

In vol. 14, p. 776, of Kuhn's edition of Galen these two sentences occur: "Amaurosis—a complete obstruction of vision without visible cause. To suffer from nyctalopia means that the patients see somewhat dimly (amauroteron) by day, more clearly in twilight, and at night more clearly still: or, conversely, poorly by day, and in the evening or at night not at all." This passage seems to be the source of the definitions of hemeralopia, nyctalopia, and amaurosis quoted by Mr. Preston, though it will be noted that, whereas Galen describes amaurosis as a complete obstruction of vision, Neame and Williamson-Noble call it a serious defect of vision. Nyctalopia and hemeralopia we must, I think, abandon. If even for Galen nyctalopia means both to see better by night than by day and to see better by day than by night, and if hemeralopia is equally paradoxical, then there is no help in them.

As for differentiating complete from partial blindness, the trouble is that in Greek as in English "blindness," "deafness," "baldness," and the like are not absolute terms, except by further qualification, or by convention, as in Galen's definition of amaurosis, they permit of gradations. A deaf man may be anything from hard of hearing to as deaf as a post; a blind man may be as blind as a bat or an owl: he may be gravel-blind or stone-blind; a bald man as bald as a coot or as a billiard ball. "Amauros" originally meant "dim," "obscure," and "amaurosis" meant "dimness of sight." It is, however, probable that in ancient Greek the meaning of the word tended to move in the direction of total loss of vision, just as the classical "amauros" (dim) has become in modern Greek "mauros" (black); though we see that even after defining "amaurosis" as complete obstruction of vision Galen in the next breath speaks of patients seeing "somewhat dimly" (amauroteron) by day. At any rate in modern medical terminology it is fair to say that "amaurosis" is the strongest candidate for the representation of total blindness from any cause. "Amauria" and "amauroma" are also, it is true, genuine though rare words, but it seems illogical and arbitrary to take three words of the same root and make "amaurosis" mean total blindness without visible cause, "amauria" total blindness, and "amauroma" partial blindness. For partial vision we have already the adequate and exact term "amblyopia"—vision which has lost its edge and is blunted but which still exists.

With regard to Dr. Price Williams's criticism that the termination "oma" denotes something concrete or objective, this is usually but not invariably true, whether in ancient Greek or modern terminology. This very word "amauroma," for example, occurs, I see, in a medical writer of the 3rd century B.C. with the meaning "dullness of vision"; and the modern glaucoma, whatever its aetiology, is rather a pathological process than a concrete object, though it must be admitted that to Galen a glaucoma meant an actual cataract.

Regarding Mr. Preston's objection to "amaurosis," when Galen defined "amaurosis" as complete loss of vision without visible cause he had just finished enumerating a list of gross ocular defects—wounds, ulceration, leukoma, staphyloma, scarring, etc., all obvious causes of total blindness. That still left him with a good deal of blindness to account for—optic atrophies, detached retina, embolism of the central artery, and so on. The first class he would designate by the name of the primary cause; the second he had to lump under the common denomination of "amaurosis." But, as Mr. Preston hints in his second letter, the ophthalmoscope has been invented since Galen's time, and there can now be few cases of complete or partial blindness without visible or at any rate ascertainable cause. "Amaurosis," in fact, in the Galenic sense has become an unnecessary term, and "nyctalopia" and "hemeralopia" are in process of becoming tobacco amblyopia or retinitis pigmentosa or vitamin A deficiency.

I suggest that we use "amaurosis" to mean complete loss of vision, without qualification of cause, and "amblyopia" to mean partial loss of vision. "Nyctamaurosis" would then mean complete loss of vision at night, if we ever needed such a term, and "nyctamblyopia" partial loss at night. Functional and orgainic are terms somewhat blown upon at the moment, but I would regard such a condition as retinitis pigmentosa as an organic, and vitamin A deficiency as a functional, nyctamblyopia.

When I saw Mr. Preston's original communication I wondered whether the resources of the English language were adequate to the need and thought of "night blindness" and "night purblindness," but if the *Shorter Oxford English Dictionary* is correct English is as ambiguous as Greek, for the first meaning of "purblindness" is "total blindness" and the second "partial blindness."—I am, etc.,

Barrow-in-Furness. JOHN WARE.

### Loneliness in Infancy

SIR,—Your excellent article on "Loneliness in Infancy" (Sept. 19, p. 345) should do much to draw attention to a line of treatment productive of good results.

Children taken from raided areas into hospital are in need of coddling, friendship, and protection. I know of children who for want of it during such strenuous days have literally turned their faces to the wall. It was not until others, infants and toddlers, behaved in the same way that we began to probe into the reason. Possibly there may be "loneliness in adults," and more than we realize, for we all know the story of the soldier who was so terribly wounded, saying, when his mother came, "Oh, nurse, how like my mother's touch!"—I am, etc.,

Eastbourne. A. H. MACDONALD.

### The Guild Spirit

SIR,—The late G. K. Chesterton, that profound philosopher-historian, would have been horrified and grieved at the idea of a State Medical Service. Chesterton always upheld the guild method, as opposed to wage slavery, whether under State capitalism or private capitalism. Every doctor to-day ought to read his essay "On the Bad Word for Guild" in his book of essays called *All is Grist*, first published in 1931. In this essay he specifically quotes the medical profession, saying:

> "Now the Guild method is no more mediaeval than it is modern, in so far as it is a principle apart from time. The best proof is that it does still exist in a practical profession with which we are all acquainted. The doctor, the ordinary general practitioner, whom most of us know and to whom many of us owe our lives, is a typical example of the member of a Guild. He is not a Socialist official; he is not a State servant; he is an example of private enterprise. That is to say, he owns his own lancet and stethoscope; he has to buy his own practice; he does in a certain degree compete with the men of his own trade. But he is forbidden to compete with them by certain methods; he is forbidden to drive another doctor out of his practice by certain expedients of self-assertion or self-advertisement; he has to observe towards his fellow-doctor a certain respect and consideration. He has to do this because he has joined a Guild or confraternity, which exists for the maintenance of the members of his profession as a whole. Its definite and deliberate policy is to keep all the doctors in existence, as far as possible, and *prevent* one of them destroying all the rest. Once it is admitted that a man may use any methods of advancement and advertisement, the chances are that about twenty honest doctors will be swallowed up by one quack. We know this is what has happened in journalism and in commerce, and in any number of other things."

Surely half the discontent in the profession to-day comes from the fact that doctors are confusing their quarrels with each other (mostly due to injured vanity) into quarrelling with the system under which they work. And every secretary of a Division must know that if only doctors would attend Division meetings more often and honestly air their views and grievances, instead of sitting on their bottoms telling all and sundry how lousy the B.M.A. is, the world would be a happier place.—I am, etc.,

WILLIAM MCKIM,
Hon. Sec., York Division.

Coxwold, York.

## The Profession Votes

Sir,—With its usual lack of logic and its usual perversity our profession has voted for changes in our organization which will have the worst features of State medicine and private practice. Our fundamental error in sounding medical opinion now about changes in our profession is that the men in the Services, who have not been consulted, are men whose practices are melting away or who have never had practices. They will, therefore, be in the position after the war of "have nots," and will hold opposite views to us who are "haves."

No attempt has been made to divert more medical man-power into industrial districts and away from fashionable watering-places; indeed, the size of the staff of our provincial hospitals is decided, not by the district's needs, but by the capacity of the wealthy patients to support the consultants. The anomaly of half the profession overworking and the other half (in peace-time) underworking has not been corrected. While we have signified our willingness to attend our rich patients for 9s. 9d. a year, or whatever we can screw out of the Government, thereby voting for a complete State Medical Service, we have not got rid of the inefficiency due to cut-throat competition. We have voted for group practice, but not that imposed by the Government. Anyone who has, as I have, tried to get a town full of "rugged individualists" to combine will know that group practice will never come of itself. My Division voted for health centres, but not ones provided by the Government, hoping that a health centre would grow out of the ground, for I am sure that we doctors will never pay the £1,000 or £2,000 per head which such a centre will cost. In fact, the mess for which our profession has voted is truly laughable. But the first election after the war will give us a Socialist Government, which, if it continues in power for 5 years, will nationalize us whether we want it or not.—I am, etc.,

Colchester. M. E. Lampard.

## Medical Planning

Sir,—I, like most other medical men, have followed the discussion which has been going on for some time in the *Journal* on the subject of proposed changes in the conduct of medical practice in this country. It would be interesting if the B.M.A. could publish at this stage a history of the rise of this demand for change, which seems to have descended upon the profession with some suddenness, despite the many preoccupations its members have at the present time. Assuming that changes have to take place, let me say at once that I am in favour of a State Medical Service and not of adaptations of the present system or intermediate schemes which dwell in no man's land. I believe that should a plan of the latter type be adopted it will simply be a matter of time before the full State service comes along.

In my view a State Medical Service means precisely what the words imply. All medical practice outside institutions would be included in it, and all hospitals of whatever type would also be in it. There would be one portal of entry into the profession, implying the abolition of the various types of examination which at present give access to the *Medical Register*. So far as possible, a period of six—preferably twelve—months would be spent by the newly qualified man in hospital posts. Thereafter he would be posted as assistant to a health centre (it seems that the idea of health centres has made a universal appeal to the profession). After a year he would be eligible for promotion to the position of principal at the same or a similar centre. His work would continue along these lines, in many cases, for the rest of his professional career, punctuated with periods of postgraduate study. In other cases within a variable period—say four years as a minimum and eight years as a maximum—the doctor would be entitled to apply for junior posts in various types of hospital or special practice—e.g., public health. Thus a man wishing to take up work in tuberculosis would, if his application was successful, be posted to a tuberculosis dispensary or sanatorium, and similarly for pure medicine, surgery, or any of the specialties. If after a probationary period he showed aptitude for the special work, his appointment to that type of work would be confirmed and he would thereafter gradually accumulate the experience and skill which would enable him to become what is called, at the present time, a "consultant" or "specialist."

It will be observed that under this scheme it would be impossible for any medical man to take up a specialty before having served for a period varying from four to eight years in the practice of general medicine. This is a reform which is urgently necessary in this country.

The plan is essentially democratic in principle for the reason that all entrants to the profession would have a relatively equal chance of advancement (when I use the word "advancement" I am not thinking in terms of finance at all). The Cabinet Minister has ordinarily to serve an apprenticeship as a back bencher. The most famous occupant of a university chair would have served his time in a health centre as a general practitioner. Who will say that this method of professional progression would not be an incalculable gain? Some might go further and say that just as a specialist in the Navy has, between his spells of employment in his own sphere, to return for a period to sea, so the specialists envisaged in this scheme might be returned for short periods to general practice in a health centre. Such a scheme would go far to prevent the growth of the caste system in medicine, and would help on the one hand to keep up the standard of general practice, and on the other to induce a proper feeling of humility in the consultant mind, a feeling always induced by contact with the problems of general practice.

I am aware that in this scheme, as in any other, there are many points of detail to be thrashed out; but in its broad essentials it possesses a unity and simplicity which may commend itself to many who are able to consider the problem in a detached way—a way incidentally not given to many.—I am, etc.,

Wrexham. D. Livingstone Pow, F.R.C.S.Ed.

## Goodwill and Compensation

Sir,—Dr. C. G. Jones (Sept. 5, p. 293), in that part of his letter dealing with "goodwill," compensation, and relative sacrifices, gives us the false analogy *par excellence*. The purpose of this war is now reasonably clear, but it has not yet emerged that those who make the supreme sacrifice do so in the cause of State (or any other) medical service. Nor do they give their lives to provide a world made safe for injustice. In other words, Dr. Jones's argument condoning non-compensation, though it will unquestionably be approved by the lay bodies who will determine these matters, is entirely irrelevant.

The question of compensation for loss of "goodwill" can be dealt with, in principle, fairly simply. "Goodwill" is not only by far the most expensive but the most indispensable asset of the general practitioner. It is, in fact, a *sine qua non*, and if it is to have a cash value that value is presumably substantial. Assessment of "goodwill" as a cash value is either right or wrong. If right, then it appears that the destruction of such an asset by authority in any change-over to a State Medical Service should carry just compensation. If wrong, then it appears that the large body of practitioners who have had to pay heavily to acquire a practice have already been very seriously victimized, if not actually defrauded. In this case the community, having approved and encouraged this business for so long, cannot in plain justice destroy without compensation this fundamental asset. Communal cynicism of such flagrancy as that may or may not have been proper to the pre-war period, but in the name of all that we are fighting for let us kill it at, or better still before, its rebirth into the post-war world.—I am, etc.,

Birmingham. W. Summers.

## Salaried Service and Competition

Sir,—I think a majority of doctors will agree with Dr. Lennox Johnston's observations (Sept. 5, p. 294). The unhealthy competition in general practice from considerations of personal gain, local prestige, and fears for an uncertain future should be eliminated. The time and energy expended in over-visiting and over-prescribing—admitted by doctors, patients, and pharmacists—could be usefully diverted to real medical and scientific work. "Free choice" savours of a pandering to the whims and idiosyncrasies of doctors and patients, and would, in my opinion, perpetuate the humbugging element now present in practice.—I am, etc.,

Luton. W. D. Hoskins.

### A Nutrition Council

Sir,—Your admirable leader on this subject (Sept. 26, p. 370) suggests some psychological difficulties which—as we medical people are all psychologists nowadays—might be discussed in a medical journal. You write: "It seems obvious that the work should not be undertaken by any Government Department which has as its head a Minister who, whatever else he is, is first and foremost a politician." That would not only seem, but be, obvious in a rational world; but we do not live in a rational world. Those of us who were brought up on Walter Bagehot's *English Constitution* recall his wise remark: "The experiment of conducting the administration of a public department by an independent unsheltered authority has often been tried, and always failed." Any department the success or failure of which has not the potentiality of making or breaking a political career will have little influence on administration. If we try to circumvent this difficulty by setting up a council of elderly notables one has a different difficulty. The publicity value of scientific skill or administrative skill within the field of nutrition is very small. The council, to have prestige value, must be "eminent"; its real work must be done by the obscurely competent. But if the members are eminent they would lose no face by *nominally* subordinate association with, say, the Medical Research Council. Only those with little dignity stand on it. There would be a clear saving in administrative expenditure; each new official organization means new staff, new offices, new competition.

These seem to me arguments in favour of Viscount Dawson's contention.—I am, etc.,

Major Greenwood.

# Medico-Legal

## A FATAL ANAESTHETIC

Anaesthetists do not often appear in court to answer charges of negligence, and so their legal pitfalls are not illuminated by much case law. A recent judgment[1] of Mr. Justice Lewis at Winchester is therefore particularly valuable. A married woman had to undergo an operation for the removal of gall-stones. The surgeon and the anaesthetist decided in consultation that anaesthesia should be induced by an epidural nerve block with decicaine. This was the first occasion on which the anaesthetist had used decicaine for this block, but the surgeon had previously used it more than once to produce splanchnic and other blocks. The anaesthetist told a sister that decicaine would be used, and instructed her to prepare the solution. This sister had the highest qualifications, had been in charge of the theatre for six years, and everyone relied on her. She had been in charge on previous occasions when decicaine had been used in the ordinary strength of 0.1%. On this occasion, however, believing that she was carrying out the anaesthetist's oral instructions, she prepared a solution of 1%, and the patient died of the overdose. On behalf of the woman's estate and as a dependant (for he was a cripple), the husband sued the anaesthetist for damages. Defending counsel were instructed by Messrs. Hempsons, Ltd., solicitors to the Medical Defence Union. At the trial the anaesthetist and the sister gave conflicting accounts of his instructions to her. His evidence was: "I said 0.1%, the solution of decicaine the same as Mr. M. [the surgeon] uses for the splanchnic nerve block." The sister, on the other hand, agreed that the anaesthetist spoke of decicaine, and that he said it was the same as Mr. M. used for splanchnic nerve block, but declared he had said 1% and not 0.1%. She added that she had thought 1% was an unusually large dose, but had no doubt that she was carrying out the anaesthetist's instructions. She produced the solution in a bottle, and the evidence again conflicted on how nearly she approached the anaesthetist with the bottle. He was busy preparing the apparatus; the sister said she came to within a yard of him and the doctor said she did not come nearer than three yards; he did not examine the bottle. They agreed that the sister said, "Decicaine; is that right?" and that the anaesthetist replied that it was; the sister, however, said she heard "1% decicaine," and the doctor said he heard "0.1% decicaine."

The learned judge said that the real question was whether the anaesthetist owed a duty to do more than state clearly to a responsible and efficient sister the anaesthetic he required. All who take part in an operation, he said, work as a team. If a sister is inexperienced, it is no doubt right for the surgeon and the anaesthetist to take care to see that she is carrying out, or is competent to carry out, the duties assigned to her; and they might have to do more for themselves in the way of supervision than they would if she were experienced. When, however, they are served by a sister upon whom every reliance can be placed, it is sufficient to say, as the anaesthetist said in this case: "I want the solution such as Mr. M. uses for a particular form of nerve block: splanchnic nerve block." The anaesthetist had given his evidence in such a low voice that the judge could well imagine the sister not hearing distinctly what he said. He could not find that in the circumstances either the anaesthetist or the sister had been negligent; an unfortunate mistake had been made. He therefore gave judgment in favour of the anaesthetist, whose counsel did not ask for costs.

The principle that a surgeon or anaesthetist may in some circumstances rely on a subordinate was recognized by the Court of Appeal in Mahon *v.* Osborne[2]—the "Manchester swab case." A swab was left in a patient's abdomen through a miscount by a nurse: Lord Justice Scott said that the surgeon has to keep in his mind the risk of error by a nurse, but on the other hand he should not be deprived of all support from the count; the jury can find negligence only if he has fallen short of the standard of reasonable care. This present application of the rule may give some reassurance to surgeons and anaesthetists.

1 Fussell *v.* Beddard, July 14.

## A DANGEROUS WORD

Much trouble is caused to the courts and much disappointment to surviving relatives by testators who make their own wills without legal advice. One common pitfall is the use of the word "children," which bars illegitimate children unless they are fully named. The word "money" is even more dangerous. Countless testators must have used it on half-sheets of notepaper and stationers' will forms with lamentable results. A wealthy lady died recently leaving investments worth nearly £33,000, a bank account, some dividends, rents, and income-tax rebate due, household goods, and some valuable freehold property. She made a will on a form purchased from law stationers, without legal aid, and used the phrase: "I direct that all monies of which I die possessed of [*sic*] shall be shared by my nephews and nieces now living"—listing fourteen people, one of whom was a sister. The judge called upon to disentangle this will held that "monies" covered only the dividends received or accrued, the cash at the bank, the rents due and the tax rebate, not the investments, the freeholds, or the household goods.

His decision was taken to the Court of Appeal and the Master of the Rolls upheld it.[3] The court is bound by a rule which, although it was formulated in 1725,[4] is too firmly established for the court to alter. It lays down that the word "money" in a will must be construed in what is called its "strict" sense unless the context permits it to be given an extended meaning. The Master of the Rolls described the rule as a blot on our jurisprudence, and said that one of its anomalies is that the "strict sense" of "money" is a sense that has been invented by the courts themselves partly in order to mitigate the rigour of a rule confining "money" to actual cash. The special category known as "money in the strict sense" includes money in no strict sense, such as moneys on drawing account at the bank. The category, however, is closed, and the Master of the Rolls could not extend it in the absence of a context in the will permitting him to do so. He observed that since 1725 the habit of investment has spread so widely that millions of persons now possess securities which they commonly refer to as their "money." It would, he thought, be a grave national misfortune if such persons were to make home-made wills referring to their "money" and thus die intestate so far as their savings were concerned. Nevertheless, the court had overlooked in 1923 and 1929 two opportunities of restating the rule, and he did not think that it would now be justified in saying that the rule no longer bound it. The other Lords Justices shared his regret at being bound by this authority. Parliament has made every effort to induce citizens to invest all their spare income in various forms of Government loans, and the thorough patriot may not be able to afford legal assistance in making a will. Many poor testators cannot afford it in peacetime. The legislature ought in fairness to pass an Act amending the present obsolete construction of "money" in a will.

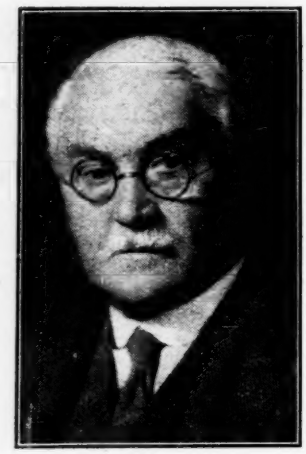
2 (1939) 2 K.B. 14.
3 *Re* Morgan, (1942) 2 All E.R. 30.
4 Shelmer's case, (1725) Gilb. Ch. 200.

# Obituary

## EDWARD FAWCETT, M.D., F.R.S.

Prof. Edward Fawcett, F.R.S., the eminent anatomist, died suddenly while walking in Park Street, Bristol, on September 23. For over 40 years he was an outstanding figure in the Bristol Medical School, to which he brought the great anatomical tradition from Edinburgh.

Born on May 18, 1867, the son of Thomas Fawcett, B.A., he was educated at Blencow Grammar School, Cumberland, and studied medicine at the University of Edinburgh, graduating M.B., C.M. in 1889 and M.D. (with gold medal for his thesis) in 1906. He was a demonstrator of anatomy at the Edinburgh School of Medicine during his two final years, and then taught for three years in the dissecting room at the Yorkshire College, Leeds, until 1893, when he was appointed to the chair of anatomy at University College, Bristol. After the creation of the University of Bristol in 1909 he continued his work as professor of anatomy and dean of the Faculty of Medicine, and held both offices until his retirement in 1934, when he was made Emeritus Professor. He represented Bristol University on the General Medical Council for ten years, and was Long Fox Lecturer at Bristol in 1910. He gave the Arris and Gale Lecture before the Royal College of Surgeons of England in 1912.



Prof. Fawcett was president of the Anatomical Society of Great Britain and Ireland in 1927-9 and its treasurer for eleven years. At the International Medical Congress of 1909 in Budapest he was honorary president of the Anatomical Section. His services as examiner in anatomy were much in demand; he had examined for the Natural Sciences Tripos at Cambridge, and for the medical degrees of the Universities of Oxford, Aberdeen, Durham, London, Leeds, Manchester, Liverpool, and Birmingham, Queen's University, Belfast, and the National University of Ireland. He was elected F.R.S. in 1923 in recognition of his contributions on anatomical and embryological subjects, more particularly concerning the development of the human skeleton and of the mammalian cranium. He wrote no book but published many papers in the *Journal of Anatomy*. Prof. Fawcett was deeply interested in ecclesiastical architecture and served as president of the Bristol and Gloucestershire Archaeological Society a few years ago. His son is Mr. Alan Wordsworth Fawcett, F.R.C.S., surgeon to the Sheffield Royal Infirmary.

[The photograph reproduced is by Elliott and Fry, Ltd.]

## ERNEST LLOYD JONES, M.D.

We regret to announce the death of Dr. Ernest Lloyd Jones, senior consulting physician, Addenbrooke's Hospital, Cambridge, which occurred on Sept. 16, in his 80th year. Dr. Lloyd Jones was born at Bowdon, Cheshire, and was educated at the Manchester Grammar School. Obtaining a Clothworkers' Scholarship he came up to Downing College, Cambridge, in 1882, taking the Natural Sciences Tripos in 1885. He won the Senior Science Scholarship at St. Bartholomew's Hospital in 1886, in due time becoming house-physician there, having qualified M.B., B.Ch. in 1888. He took his M.D. degree in 1891. In 1894 he won a research scholarship of the British Medical Association. Returning to Cambridge he became demonstrator of pathology under Prof. Roy, and also pathologist to Addenbrooke's Hospital. Although in active practice until some eighteen months of his death, Dr. Lloyd Jones retired from the honorary staff of Addenbrooke's as senior physician in 1927. For many years he had also been on the visiting staff of Papworth Village Settlement, being a member, and latterly chairman, of the committee of management. In the last war Dr. Lloyd Jones served as a major on the staff of the First Eastern General Hospital, and was also inspector of tetanus cases in the Eastern Command. He was president of the Cambs and Hunts Branch of the British Medical Association in 1925-6, and a past-president of the Cambridge Medical Society. In 1901 he married Constance Mary Brooke. They have one daughter. His medical works include *Chlorosis, the Special Anaemias of Young Women, its Causes, Pathology, and Treatment.*

A fellow of the Geological Society, and of the Cambridge Philosophical Society, Dr. Lloyd Jones was writing at the time of his death a book on foraminifera, on which subject he was an acknowledged authority. As a young man he explored the Hoyle's Mouth and Coygan Caves in South Wales, and had presented several fossil specimens to the museums of geology and archaeology at Cambridge. He had a wide range of interests, with an intimate knowledge of many aspects of Nature collected on rambles on seashore and countryside. The cries and habits of birds were always an absorbing interest of his, and his delight in caring for individual animals and plants was an inspiration in itself. He had a real concern for his patients and put his professional service above all thoughts of remuneration, and frequently, and especially during the last few years of failing strength, without any consideration for his own health. Many a one has been braced and comforted by his cheery stories. He had a most kindly and gentle nature, and his patients, both in private and hospital practice, looked upon him as a real friend. It can truly be said of him that he was a beloved physician. H. B. R.

## JAMES R. KERR, Ch.M.

The death of Dr. J. R. Kerr, C.B.E., of Southport on Sept. 21 marks the end of a distinguished and honourable career. Ten years after taking his degree in the University of Glasgow and holding resident appointments in the Western Infirmary and the Royal Hospital for Sick Children he went to France, and under the French Red Cross he became surgeon-in-chief to the Hôpital de l'Alliance at Yvetot. This was the opportunity for which he had been preparing, and his work earned him a fine reputation. From this service he came home to take charge of the special orthopaedic hospital maintained by Messrs. Pilkington Brothers at St. Helens. Here Kerr applied himself to the study and practice of rehabilitation. He was in the van in this country in this work. His contribution to it has perhaps hardly been recognized, but the hospital at St. Helens achieved a reputation under his charge, and was visited by many interested in rehabilitation after industrial accidents as well as after war injuries. When the British Medical Association met at Glasgow in 1922 he was secretary of the Section of Industrial Diseases and Forensic Medicine. He served as chairman of the St. Helens Division in 1922-3 and at the time of his death was chairman of the Southport Division. In practice in Southport, Kerr joined the staff of the infirmary as surgeon, and at the beginning of the present war was appointed also to the staff of the Emergency Hospital, where he had charge of beds. His colleagues and many friends will miss his robust company and his loyal friendship. K. W. M.

The special hospital at St. Helens, to which Kerr returned after his strenuous two years at Yvetot during the last war, was a true rehabilitation centre, where injured workmen and military casualties were treated from the time of their injury until their return to work. The results obtained in this way were so good that the hospital was continued for several years after the war. It was one of the first hospitals directly connected with industry in which active surgical work and rehabilitation were carried on to their logical termination, and the influence of Kerr was seen in every detail of the hospital's work. He transferred to Southport almost 20 years ago, and as a member of the surgical staff of the Southport Infirmary devoted himself with the same whole-heartedness, to the great benefit of the staff and of the people of the district. He always continued his interest in the work which he initiated at St. Helens, and during the present war he had been very active in carrying out a similar line of treatment in the very large

Southport E.M.S. Hospital. He will be remembered by all who knew him for his extreme kindness, his capability, the assiduity with which he carried out his work, and the many contributions which he made to the literature of the surgery of industrial injuries. In the present war he had suffered the loss of one of his three sons, a second son is a prisoner of war, and a third is now an active member of the surgical team of one of the large hospitals in the Middle East. To them and to his widow will be extended the sympathy of all who knew him.

T. P. McM.

### PROF. DAVID WATERSTON

Prof. D. R. Dow, M.D., University College, Dundee, sends the following appreciation:

The death of Prof. David Waterston removed one of the distinguished anatomists of the Edinburgh School, and a familiar figure for the past 28 years in the life of the University of St. Andrews. As successor to Musgrove he became the second occupant of the Bute chair of anatomy, and his tenure of office has been a memorable one. At the time of his appointment in 1914 the number of entrants to the Faculty of Medicine in our University was comparatively small, but he forecast that there would be a substantial increase, that our medical school would play a more important part in medical education, and his ability and influence have undoubtedly contributed to this. Under his direction the department of anatomy has undergone progressive development. He felt that the work should be carried out in an environment as pleasing as possible, and free from the horrors which haunt the mind of the beginner. and thus to-day there stands in St. Andrews a monument to his aim—a dissecting room of modern design and picturesque appearance.

Waterston was a man of wide interests, but he was first and foremost an anatomist, extending his study not only to the human but to the comparative, and science has benefited from his industry in these fields. His own career, as one would expect, was influenced by Sir William Turner. One could not fail to be impressed by his precision in expression, his critical attitude to any scientific statement, and his powers of observation always keen and astute, his eager mind stretching out after more and more facts. His numerous researches include papers on general anatomy, anthropology, and embryology. He possessed a fine collection of microscopical sections of early human embryos which enabled him to model in wax many specimens which, after careful and painstaking examination, have lightened the field of human embryology. Mounted in album form, photographs of these serial sections have found a place in many laboratories of this country. Much of his technical skill was directed to making the science of anatomy a living one, and we have testimony to this in his volume *Anatomy in the Living Model*. I spent much time with him when he prepared the orthogonal projections of the head and neck and abdomen which formed a large part of this publication, and it is almost unnecessary for me to testify to the care and precision with which this work was done. He was also one of the contributors to Cunningham's *Textbook of Anatomy*, in which he presented a lucid and up-to-date description of the digestive system. As joint editor of the *Edinburgh Stereoscopic Atlas of Anatomy*, the vision of many students has been enlightened as they reviewed in rapid succession photographs of his own handiwork.

In addition to such specialized study he retained a keen interest in clinical medicine, and found scope for his ingenious mind in the problems which presented themselves in the work of the James Mackenzie Institute. He looked forward with enthusiasm to the arrival in St. Andrews of Sir James Mackenzie, and for many years each enjoyed the privilege of work and friendship with the other. After his death the Institute found in Waterston a staunch and able leader, while as one of its research workers he conducted experiments on himself in order to elucidate the mechanism of pain—a contribution of the highest value. Generations of students of the Universities of Edinburgh, London, and St. Andrews will remember with appreciation how the teaching of anatomy was enhanced by the freshly dissected specimens which accompanied each demonstration and by the blackboard, on which Prof. Waterston had ample scope for his artistic talent. The entrant medical will reflect on the warmth of the reception and introduction to University life given by the Adviser of Studies. Outside the sphere of work as a Regent he was kind, hospitable, and interested. To those who were associated with him in his work, his distinctive personality and influence were a source of continual interest, encouragement, and stimulus. To junior members of his staff he was invariably courteous, and never too busy to listen to their problems or to help them by advice.

Dr. WILLIAM BRUCE WISHART, for many years a well-known Halifax practitioner, died on September 4 in Edinburgh. He graduated M.B., Ch.B.Ed. in 1904 and went to Halifax five years later, after holding house appointments at the North Staffs Infirmary and Stoke-on-Trent Eye Hospital. His connexion with the Halifax Royal Infirmary began as house-surgeon, and he was later appointed honorary surgeon, retiring from the active staff in 1938. During the last war he served with the R.A.M.C. in France and Belgium. Dr. Wishart joined the B.M.A. in 1907 and was chairman of the Halifax Division in 1926–7.

The announcement of the death of Mr. ALWYNE T. COMPTON, F.R.C.S., will be received with profound regret by his many friends and colleagues at the German Hospital, Dalston, and by his former pupils at King's College, University of London. Born in 1874, he received his medical education at St. Bartholomew's, qualified in 1901, and obtained the F.R.C.S. in the following year. On the outbreak of the present war, although he had retired from practice, he generously offered his services once more at the hospital at Dalston where he had acted with distinction for many years. The return to active work was unfortunately attended by the occurrence of a stroke which left him for the remainder of his life with a partial paralysis. Recently his house in Devonshire was bombed by enemy action, and owing to a fall afterwards his hip was fractured. He died on Sept. 9 in his old hospital, where he will long be remembered as an honoured and faithful servant in the cause of his profession. In addition to his surgical work, Compton's anatomical and pathological knowledge was very extensive. His case notes mostly contained illuminating drawings. His anatomical teaching at King's College was held in high esteem. From his father, who was a well-known landscape-painter, he doubtless derived his skill as a draughtsman.

Mr. R. W. Crawford Treasure, whose death was reported in the *Journal* of Sept. 12 (p. 326), saw service in France in the last war, only going to India in 1916 after being invalided from the Army.

## Universities and Colleges

### UNIVERSITY OF GLASGOW

The Dean of the Faculty of Medicine gives notice that, at the desire of the Secretary of State for Scotland, the University of Glasgow has decided not to accept, for the duration of the war, students wishing to enter upon the course for the Diploma in Public Health.

## The Services

The D.S.C. has been awarded to Temp. Surg. Lieuts. H. S. A. Corfield, K. C. Jeffery, and R. D. Robinson, R.N.V.R.

### CASUALTIES IN THE MEDICAL SERVICES

Lieut. HEDLEY DOUGLAS VENNING, R.A.M.C., was killed in action in the Middle East in Sept. He was born on March 2, 1916, and studied at Guy's Hospital, qualifying M.R.C.S., L.R.C.P. in 1939, and graduating M.B., B.S.Lond. in 1940. He had held house posts at Torbay Hospital, Torquay, and, later, an assistantship in Chester. He entered the R.A.M.C. as a temp. lieut. in Aug., 1941. He leaves a widow.

*Prisoners of War.*—Lieut. D. Christison, R.A.M.C., Capt. D. Foskett, R.A.M.C., Major D. A. Macpherson, R.A.M.C., Capt. R. G. Main, R.A.M.C., Capt. C. L Malhotra, I.M.S.

*Missing.*—Surg. Lieut. H. E. D. Gale, R.N.V.R., Capt. J. S. McConnachie, R.A.M.C., Lieut. W. H. McDonald, R.A.M.C., Lieut. K. W. Todd, R.A.M.C.

### DEATHS IN THE SERVICES

Lieut.-Col. WILFRID EDWARD BRIERLEY, I.M.S. (ret.), died at Kitamaiyu, Ruiru, Kenya Colony, on Sept. 11, aged 61. He was born on Jan. 17, 1881, and was educated at the University of Manchester, graduating M.B., Ch.B.Vict. in 1904. He also studied at King's College and the London Hospital, taking the M.R.C.S., L.R.C.P. in 1905, and the F.R.C.S. two years later. He entered the I.M.S. as lieut. in 1908, became lieut.-col. after twenty years' service, and retired in 1933.

No. 36

## INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Sept. 12.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

*Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for:* (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

| Disease | 1942 | | | | | 1941 (Corresponding Week) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (d) | (e) | (a) | (b) | (c) | (d) | (e) |
| Cerebrospinal fever | 62 | 4 | 21 | — | 2 | 128 | 7 | 23 | 1 | 7 |
| Deaths | | 1 | 1 | | | | 1 | 1 | | |
| Diphtheria | 855 | 39 | 202 | 46 | 18 | 820 | 48 | 234 | 21 | 24 |
| Deaths | 17 | — | 2 | — | — | 17 | — | 5 | — | 1 |
| Dysentery | 146 | 13 | 64 | — | 3 | 66 | 6 | 49 | — | — |
| Deaths | | | — | — | — | | | — | — | — |
| Encephalitis lethargica, acute | 1 | — | 1 | — | — | 3 | — | — | — | — |
| Deaths | | 1 | — | | | | — | — | | |
| Enteric (typhoid and paratyphoid) fever | | | | | | 46 | 15 | 8 | 7 | 8 |
| Deaths | | | | | | 2 | 2 | — | — | — |
| Erysipelas | | — | 54 | 8 | 1 | | — | 42 | 4 | 6 |
| Deaths | | — | — | | | | — | — | | |
| Infective enteritis or diarrhoea under 2 years | | | | 156 | | | | | | |
| Deaths | 73 | 6 | 12 | 10 | 6 | 41 | 4 | 19 | 27 | 5 |
| Measles | 2,644 | 221 | 124 | 9 | 25 | 944 | 30 | 12 | 46 | 2 |
| Deaths | 1 | — | 3 | — | 1 | 3 | — | — | 2 | — |
| Ophthalmia neonatorum | 76 | 5 | 6 | | — | 71 | 5 | 12 | | — |
| Deaths | | | | | | | | | | |
| Paratyphoid fever | 7 | 2 | 1 | 1 | — | 182 | 8 | 10 | — | — |
| Deaths | — | — | — | — | — | 2 | — | — | — | — |
| Pneumonia, influenzal* | 319 | 20 | 4 | 3 | 4 | 407 | 12 | 3 | 1 | 4 |
| Deaths (from influenza) | 3 | — | — | — | — | 3 | 14 | 2 | 1 | 6 |
| Pneumonia, primary | | | 124 | 12 | | | | 144 | 12 | |
| Deaths | | — | | 7 | 5 | | — | | 5 | — |
| Polio-encephalitis, acute | 2 | — | — | | | 3 | — | — | | |
| Deaths | | — | | | | | — | | | |
| Poliomyelitis, acute | 20 | — | 2 | 15 | 1 | 29 | 1 | 6 | 2 | 1 |
| Deaths | | — | — | | | | — | — | | |
| Puerperal fever | — | 1 | 15 | 4 | — | 1 | 1 | 17 | 4 | — |
| Deaths | | | | | | | | | | |
| Puerperal pyrexia | 125 | 6 | 14 | | 1 | 116 | 8 | 19 | | 2 |
| Deaths | | | | | | | | | | |
| Relapsing fever | — | — | | | — | 1 | — | | | — |
| Deaths | | | | | | | | | | |
| Scarlet fever | 1,618 | 83 | 318 | 36 | 47 | 956 | 34 | 184 | 39 | 10 |
| Deaths | — | — | — | — | — | 1 | — | — | — | — |
| Small-pox | — | — | — | | — | — | — | — | | — |
| Deaths | — | — | — | — | — | — | — | — | — | — |
| Typhoid fever | 30 | — | 1 | 11 | 1 | | | | | |
| Deaths | 1 | — | — | — | — | | | | | |
| Typhus fever | — | — | — | — | — | — | — | — | — | — |
| Deaths | | | — | — | — | | | — | — | — |
| Whooping-cough | 1,074 | 99 | 63 | 112 | 4 | 3,029 | 238 | 185 | 40 | 2 |
| Deaths | 3 | 1 | — | 1 | — | 18 | 2 | 3 | 3 | 1 |
| Deaths (0–1 year) | 313 | 32 | 53 | 30 | 17 | 300 | 28 | 57 | 48 | 20 |
| Infant mortality rate (per 1,000 live births) | | | | | | | | | | |
| Deaths (excluding still-births) | 3,403 | 459 | 480 | 161 | 97 | 3,080 | 481 | 527 | 205 | 115 |
| Annual death rate (per 1,000 persons living) | | | 10·8 | 10·7 | † | | | 11·5 | 13·6 | † |
| Live births | 5,890 | 702 | 809 | 385 | 259 | 4,846 | 432 | 811 | 379 | 225 |
| Annual rate per 1,000 persons living | | | 16·7 | 25·7 | † | | | 16·5 | 25·2 | † |
| Stillbirths | 226 | 17 | 37 | | | 150 | 6 | 32 | | |
| Rate per 1,000 total births (including stillborn) | | | 44 | | | | | 38 | | |

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

## EPIDEMIOLOGICAL NOTES

### Discussion of Table

In *England and Wales* rises occurred during the week in the incidence of scarlet fever 146 cases, diphtheria 68, dysentery 34, and typhoid 23, and decreases for measles 380, whooping-cough 123, puerperal infections 73, and acute pneumonia 60.

Within the counties the notifications of diphtheria, acute pneumonia, and whooping-cough showed only slight variations from last week's totals, the only marked change being in Staffordshire, where 26 fewer cases of whooping-cough were reported.

Scarlet fever notifications rose because of an increase of 57 cases in Yorks West Riding, of 40 in Lancashire, and of 27 in Essex; in London the notifications dropped by 33. In Yorks West Riding the recent outbreak has been particularly severe in Goole M.B., where hospital accommodation has been strained and patients have had to be sent to neighbouring hospitals.

The incidence of measles declined for the tenth consecutive week. In Leicester, however, there was an increase of 53 cases due to an outbreak in Coalville U.D. 57 cases. The Durham notifications also rose by 41, due to an outbreak in Crook and Willington U.D. 55 cases. The largest decreases were recorded in Yorks West Riding 130, Essex 74, London 74.

An outbreak of typhoid in Bedfordshire, Biggleswade R.D., involved 18 persons and resulted in the largest weekly total recorded for this disease since last October.

No new outbreak of dysentery occurred during the week. The rise in notifications was due to an increase in those outbreaks which began last week. The chief centres of infection were: Oxfordshire 41 (Bullingdon R.D. 5, Oxford C.B. 8); Lancashire 21 (Warrington R.D. 14, Manchester C.B. 6); Norfolk 16 (Norwich C.B. 12); London 13 (Woolwich 7); Surrey 12 (Epsom and Ewell M.B. 7).

In *Scotland* the incidence of infectious diseases showed little change from last week, although acute primary pneumonia and scarlet fever rose by 18 and 43 cases. A small rise in scarlet fever was fairly general throughout the country, but the excess of pneumonia was mainly confined to Glasgow.

In *Eire* there was a rise in the incidence of poliomyelitis. During the past two weeks 25 cases have been notified, 10 of which were reported from Dublin.

### Small-pox

A report has been issued by the Medical Officer of Health for Glasgow on the recent outbreak of small-pox. Altogether 36 persons contracted the disease and 8 died: 11 of the cases were due to direct infection on the ship, and 25 cases occurred in the general population.

No satisfactory explanation can be given for the spread of the infection among the civilians in different districts of the city. The report emphasizes the success of vaccination in preventing a major epidemic and makes strong recommendations concerning the vaccination of crews and passengers travelling from the East.

### Quarterly Returns

*England and Wales.*—The returns for the June quarter show that, despite three years of war, an improvement was effected on the general peacetime trend of the vital statistics. The birth rate was 16.2 per 1,000, which, with the exception of 1940, when the rate was the same, was the highest birth rate in any second quarter since 1932, when it was 16.5. The infant mortality was 47 per 1,000 live births, 7 below the average of the ten preceding second quarters. The stillbirths were 3.3% of the total births registered. The general death rate was 11.3 per 1,000—the lowest rate for this quarter since 1933—compared with a rate of 13.6 in 1941. The natural increase—excess of births over deaths—was 50,723, compared with 43,777, 46,980, and 7,228 for the corresponding quarters of 1939-41.

*Northern Ireland.*—A favourable experience was enjoyed by Northern Ireland during the second quarter of the year.

The births corresponded to a rate of 24.7 per 1,000, compared with 21.7 for the average of the second quarters of the five preceding years. The infant mortality was 71 per 1,000 births, or 1 below the five-year average. The general death rate was 13.2 per 1,000; this rate was 4.7 below that for the corresponding quarter of 1941 and 1.4 below the average rate for the second quarters of the five preceding years. The death rate from tuberculosis was 1.01 per 1,000, which, although 0.11 below the rate for the June quarter of 1941, was 0.03 above the five-year average.

### Returns for the Week Ending September 19

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,882, whooping-cough 1,150, diphtheria 878, measles 2,998, acute pneumonia 401, cerebrospinal fever 72, acute poliomyelitis 29, dysentery 184, paratyphoid 8, typhoid 13.

# Medical News

At a meeting of the Royal Sanitary Institute to be held at Hallam Municipal Hospital, West Bromwich, on Saturday, Oct. 10, at 11 a.m., Dr. W. S. Walton will read a paper on "Some Practical Health Problems of To-day from the Medical Officer of Health's Standpoint."

A memorandum issued by the Greek Government states that according to the Red Cross about 40,000 persons, including a high proportion of children, in Athens and the Piraeus died of famine and diseases caused by malnutrition between Oct. 1, 1941, and Jan. 26, 1942. The quality of such food as is available is low through lack of fats. Each daily ration contained only 500 calories against the 2,500 issued by feeding centres in the previous winter. The situation in other cities such as Salonika, Patras, and Volo, as well as in the islands of Chios and Syra, is equally tragic.

Sulphanilamide powder (4 oz.) and powder dredgers are to be issued to first-aid points for use where there is difficulty in removing a casualty to a first-aid post or hospital. Ministry of Health Circular No. 2664 states that a thin, uniform coating of the powder should be shaken on the surface of the wound and a dressing applied. Hydrogen peroxide is to be issued to first-aid posts and gas-cleansing stations for the treatment of lewisite burns.

Doctors wishing to engage dispensers who are subject to the Employment of Women (Control of Engagement) Orders must notify the Central Pharmaceutical War Committee, 17, Bloomsbury Square, W.C.1, which is the approved agency for the Ministry of Labour under the Orders, giving full particulars of the vacancy to be filled.

The 114th annual meeting of the Medical Charitable Society for the West Riding of the County of York was held at Leeds under the presidency of Dr. T. Wardrop Griffith. The society was founded in 1828, and since that time it has distributed £111,155 among the applicants for help. For the ensuing year, forty-two grants, totalling £1,868, were made. It was reported that a form of covenant had been circulated to the members, who were urged to enter into it. The result of this would be that the society could recover income tax on such subscriptions. It was decided that a part of the extra income resulting from this would be distributed as a Christmas gift to each recipient of a grant.

Dr. Austin William Byrne, expert in public health, Egyptian Government, has been appointed a C.B.E. (Civil Division). The citation in the *London Gazette* states that since the beginning of the war Dr. Byrne has co-operated with the medical services of the British Army in Egypt and has been particularly helpful in co-ordinating the services of the Egyptian Government hospitals in connexion with facilities for the treatment of prisoners of war, which, without his help, would have been an insurmountable problem.

Mr. Robert Brough, registrar of the Glasgow University General Council and acting secretary of the University Court, has retired after nearly 40 years' service to the University. The General Council is organizing a testimonial to him, and subscriptions (limited to 5s.) should be sent to the Clerk, Mr. David M. Hutchison, M.A., LL.B., 82, West Regent Street, Glasgow, C.2.

The September quarterly number of *Medicine Today and Tomorrow* is mainly devoted to "The Socialist Programme for Health," which takes the form of a statement of policy in the light of the Medical Planning Commission's interim report. Copies may be had (price 6d.) from 176, Kew Road, Richmond, Surrey.

We have received from Dr. J. Tyler Fox (treasurer of the British Branch of the International League against Epilepsy (The Homestead, Lingfield, Surrey) a copy of the last issue of the periodical *Epilepsia*, dated July, 1941, and printed in America by the Graphic Press, Newton, Massachusetts. Present conditions in Europe make it impossible to edit and publish the journal in Denmark.

At the first meeting recently of the Colonial Research Committee Lord Cranborne said that the two functions of the committee were to advise on schemes for assistance from the £500,000 a year provided under the Colonial Development and Welfare Act for "research and inquiry," and to survey "the whole range of research in Colonial studies." Among the members of the committee are Prof. A. V. Hill, Sir Edward Mellanby, and Dr. W. W. C. Topley.

Mr. Bowdler Henry has been appointed honorary consulting oral surgeon and consultant adviser to the Royal Netherlands Army, the Fighting French Forces, the medical section of the Czechoslovak Red Cross, the Central Committee, Polish Red Cross, and the Royal Norwegian Ministry of Social Welfare.

# Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.
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## QUERIES AND ANSWERS

### Aspirin for Asthma

Dr. K. TEMPLE BROWN writes: A. K. describes dramatic success with homoeopathic doses of aspirin in asthma. I feel it only right to record the experience of a colleague of mine, equally dramatic. He has suffered from bronchial asthma for years and used to tolerate aspirin, but a few years ago took 15 grains for a cold and within a quarter of an hour was in the grip of the worst bronchial spasm he had ever known, requiring morphine and oxygen inhalations. He tells me that his is not an isolated case and that phenacetin produces the same effect. Other readers of the *Journal* may be glad of this warning. I know of no pharmacological explanation of A. K.'s findings—but faith moveth mountains. Certainly, I know of asthmatics unrelieved by ephedrine but relieved by "special ephedrine," which consisted of calc. carbonate. Apart from that, it seems likely that in his patient aspirin's sedative action depresses a psychogenic factor in the aetiology of her bronchial spasm.

Dr. M. W. BROWDY (London, W.) writes in reply to A. K. (Sept. 19, p. 356): Asthma is often of psychological origin: a somatic symptom in a neurotic syndrome. Hence aspirin may give relief in two ways: by suggestion and mild sedation.

Dr. J. E. O'LOGHLEN writes in reply to A. K.: The effect of aspirin in asthma is due to a lowering of surface blood tension. Incidentally 20% of asthmatics are very sensitive to aspirin; 50% of all asthmatics respond favourably to any indifferent treatment.

### Desert Sores

Col. C. RICHARDSON-WHITE (Merthyr Vale, Glam.) writes: Is the desert sore our old friend the veldt sore which we treated in the Boer War and the septic sore of 1914-18 in Egypt, Sinai, and Palestine? I commanded a C.C.S. throughout the last war, nearly all the time in the East. During the advance on Gaza and afterwards hundreds had septic sores and filled the hospitals, thus depleting the front line. At a field laboratory at Gaza one of the officers discovered that the film on these sores had a diphtheritic appearance. He tried for Klebs-Loeffler bacillus and found it, together with the *Streptococcus pyogenes*. Orders were issued to all medical units to apply for antidiphtheritic serum, and to inject 3,000 units in all cases of septic sores. The result was like a miracle. All the cases responded and were soon cured.

### Income Tax

*Appointment*

W. is assessed under Schedule E in respect of a salary of £306 from an appointment as works M.O. Can he claim to have the salary included in his Schedule D assessment?

*** There is no legal claim, but it is a common and well-established practice of the Inland Revenue Department to adopt that procedure if requested to do so by the taxpayer. We suggest that W. apply accordingly to the local inspector of taxes.

*Married Woman*

B. is married and has one child under 16 years of age and a dependent widowed mother. Her husband is interned and has at present no income of his own. She has been assessed as assistant M.O.H. as a single person (with £80 personal allowance only) and no deduction has been made for professional subscriptions or domestic help.

*** On the basis that B. is "living with" her husband in intention, although temporarily apart for reasons beyond their control, the husband should strictly be assessed in respect of B.'s earnings. But whether he or she be assessed, the allowances due are

£140 (for married persons) and £80 "wife's earned income allowance," as well as £50 for the child and £25 for the dependent relative. A declaration of income and claim to these allowances is, however, necessary by the husband. We suggest that B. explain the circumstances to the local inspector of taxes and ask him for a copy of the appropriate form of claim. No allowance is due for domestic expenses; professional subscriptions are allowable only if membership of the association in question is a condition of the appointment.

*Commencement of Liability from Employment*

M. G. qualified in July, 1940. He earned £200 between that date and April, 1941, and another £200 in the year to April, 1942, including one month's earnings from his present employment (at £600 per annum) in March, 1942. How should his liability be calculated?

*** On the above facts the appointment is a new source of income, and he is liable on the basis of the earnings of the current year for the part of 1941-2 and the whole of 1942-3. The deductions made for tax for the year commencing November, 1942, will be in respect of the income for the year commencing April, 1942. If the appointment should terminate, M. G. should at once inform the inspector of taxes, but it is unlikely to do so at such a time as will leave him in the position of having paid more tax than was due on his earnings.

*Assistant's Board and Lodging*

T. C. is "employed as an assistant at a salary of £500 per annum, all found; by this the agreement means that my employer pays £2 12s. 6d. per week board and lodging for me." Is he assessable, or is his employer assessable on this sum?

*** His employer is clearly entitled to treat the payment of the weekly amount as deductible for income tax purposes. As regards T. C., *prima facie* he is *not* liable, as benefits are not taxable unless they are received in money or in a form convertible into money. The only contention which could be raised in favour of his liability is that if he has contracted with his landlady to pay her £2 12s. 6d. a week and his principal pays it for him, then the principal is in law and substance paying him money by discharging his debt. It may be desirable therefore to see that the contract for the board and lodging is between the employer and the landlady and not between T. C. and the landlady.

## LETTERS, NOTES, ETC.

### Fuel Economy

Prof. R. J. WILLAN writes: During the present emergency could not an appeal be made to all surgeons to refrain from the present wasteful practice of using running hot water when making their hands surgically clean. An equal result can be obtained by using two or three changes of hot water. Running hot water is a luxury but is *not* a necessity. A surgical team of, say, four persons, scrubbing up their hands for an operation for the requisite ten minutes, can consume and waste an unjustifiable amount of fuel.

### Bleeding from Tooth Sockets

C. R.-W. writes: With regard to bleeding from tooth sockets, what is wrong with the old-fashioned friars' balsam (tinct. benz. co.)? It is a bit messy, I suppose, but always efficient. A plug of cotton-wool soaked in this quickly does the trick. I have never found it to fail.

### External Styptics

Dr. C. CHARNOCK SMITH (Hastings) writes: May I suggest as useful styptics, which can be easily carried in one's bag for use in the case of bleeding tooth sockets, epistaxis, and haemorrhage from a fungating malignant growth, the following to be used locally: adrenaline chloride 1 in 1,000; "stypven"; turpentine; stick of nitrate of silver; and liq. ferri perchlor. fort. or gossypium ferri perchlor. *B.P.C.* used dry.

### Treatment of Scabies

Dr. J. E. O'LOGHLEN (London, W.1) writes: For the past 20 years I have always treated scabies with the application of sodium hyposulphite and hydrochloric acid. It is most effective, being cheap, clean, and convenient. I think it was first introduced in France by Leblanc-Dutheil (Nantes). Some 12 years later it was used by Demjanovic at the State Dermatological Institute, Moscow, and later in Germany at the Skin Clinic, Düsseldorf. The technique is as follows. Two solutions are used: (1) sodium hyposulphite 200 parts to 1,000 water; (2) a 5% solution of hydrochloric acid. The whole body is rubbed with solution No. 1, which is applied with a piece of cotton-wool and allowed to dry for a few minutes. When dry, solution No. 2 is applied in the same way. The patient is then instructed to put on a shirt without drying the body and goes to bed. Next morning solution No. 1 is applied as before. This treatment is carried out for 2 successive days; very rarely is it necessary to continue treatment on the third day. Having finished the treatment the patient puts on clean underwear and returns to work. There is no necessity for any applications of ointments or soap. The underclothing is not damaged, the skin is not irritated, the solution has no odour, and the itching stops at once. This treatment has been carried out in many thousands of cases, and is particularly suitable in the treatment of large numbers—schools, military barracks, etc. Solution No. 1 is sometimes used more concentrated—1 to 3—but the strength of solution No. 2 is always 5%.

### Army Discharge

"DEVONIAN" writes: From a rural community of approximately 2,000 over 60 men have entered various Services since the outbreak of war, all being medically examined by the same medical board. To date 11 have been returned to civilian life "unfit for any form of military service." All had been graded A1. I have seen their "papers." One, having no previous medical history of note, discharged with bronchiectasis, now has an arduous day as a milk roundsman. Another, an agricultural labourer, was discharged with duodenal ulcer; he has not sought advice or assistance for his complaint during the 12 months he has been at home. A general carpenter sent back with "rheumatism" has not missed a day's work since his return, and spends most of his time outdoors on the roofs of Government buildings! Discharged "because he could not wear Army boots," a general labourer walks at least 4 miles a day and earns not less than £5 per week. An Army driver was sent home "because he had attacks of giddiness when driving trucks"; he now handles charabancs and 8-wheeler cattle trucks. Similar cases could be detailed. Apparently no re-examination is possible. One only of the 11 has required medical attention, and that for an unrelated complaint. After a week or so at home it would appear that the disability vanishes and the prospect of a lucrative job works magic as a permanent therapeutic power. The men concerned all "wanted to get out," and one or two have admitted that they "kept at it until they were given their ticket." Is this how we win the war?

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## MEDICINE 100 YEARS AGO

Extracts from an article entitled "Sketches of American Physicians" by Nathaniel Chapman, M D., reprinted in the *Provincial Medical Journal* of October 1, 1842, from the *Medical Examiner*:

"Dr. Chapman was born in Fairfax county, Virginia, on the 28th of May, 1780, and has, therefore, nearly completed his sixty-second year. His paternal ancestor came to Virginia with the first colony, was a captain of cavalry in the British army, and, according to an authentic tradition in the family, was the youngest son of a cousin german of Sir Walter Raleigh. The family settled on the river Pomonkey, some twenty miles from Richmond; but the branch from which the doctor is descended migrated about a century and a half ago to Maryland, and fixed itself on an estate on the banks of the Potomac, nearly opposite Mount Vernon, which is still in their possession. The doctor's father, however, went to Virginia, upon his marriage, where he afterwards remained. Dr. Chapman received his early education at the Classical Academy of Alexandria, D.C., founded by General Washington, where he was six years. He subsequently spent a short time in two colleges, though not long enough to owe either any obligation. He came to Philadelphia in the autumn of 1797, to commence the study of medicine with the late Professor Rush, of whom he became a favourite pupil. . . .

"In 1801 he went abroad, and spent four years, chiefly at Edinburgh and London. He remained a year in London, the private pupil of Abernethy, and thence passed to Edinburgh. Edinburgh was then celebrated equally for her school of medicine and her literary and scientific society. Students of medicine resorted thither, as now to Paris, from all parts of the world. Nearly all our American physicians of the olden time—Morgan, Shippen, Kuhn, Rush, Wistar, and many others—received their education at Edinburgh. It may be supposed that Dr. Chapman made the most of his opportunities in the distinguished circle of the modern Athens. . . . Dr. Chapman returned to this country in 1804. . . . He was the physician and confidential friend of the Count de Survilliers (Joseph Bonaparte), during his long residence in Philadelphia and its vicinity. From the Count he gathered a large fund of interesting anecdote of the illustrious brother of the ex-king, and the men and scenes of his eventful times, from which the doctor occasionally draws. . . . As a practitioner, Dr. Chapman is distinguished as much for the charm of his manner in the sick chamber as for skill and success in prescribing. His lively conversation and ever-ready joke are often more effective than anodyne or cordial. Indeed, in cases of trifling importance, the doctor sometimes prescribes little else. In pleasant chit-chat, both patient and physician forget the object of the visit, and the doctor will depart and 'leave no sign' for pill or bolus."

*** The *Provincial Medical Journal* subsequently became the *British Medical Journal*.